



FRIDAY, JANUARY 22.

Report of the Senate Committee on Inter-state Transportation.

The report of the Select Committee of the Senate upon Interstate Railroad Transportation to accompany the Cullom Inter-state Commerce bill introduced Jan. 18, forms a printed volume of 216 pages.

The interest everywhere manifested in the investigation, the report says, convinced the committee that no general question of governmental policy occupies at this time so prominent a place in the thoughts of the people as that of controlling the steady growth and extending influence of corporate power, and of regulating its relations to the public, and as no corporations are more conspicuously before the public eye, and as there are none whose operations so directly affect every citizen in the daily pursuit of his business or avocation as the corporations engaged in transportation, they naturally receive the most consideration. The committee quotes from the testimony of Edward Atkinson an estimate that railway property constitutes one-fifth part of the accumulated capital of the country to-day, giving employment to 650,000 people, not including those engaged in construction; moving 400,000,000 tons of freight annually, one half of which is food and fuel, from which Mr. Atkinson argues that the railroad has reduced the struggle for food and fuel in greater measure than any other instrumentality, having brought the movement of a year's supply of food for the mechanic in Massachusetts a distance of 1,000 miles down to the measure of one day's labor. The committee illustrates with a series of tables its chapters upon the internal commerce of the country, the traffic of the trunk lines, the cotton crop, and the relations of internal and external commerce to agriculture.

In its discussion of the power of Congress to regulate commerce, the committee reviews exhaustively the declarations of the United States Supreme Court on the subject. "From the judicial construction of the word commerce," it says, "by the court of last resort, it is apparent that it has a very wide meaning as employed in the constitution, and that it includes not only intercourse and traffic, but as well the subject matter of intercourse and traffic, and also the channels through which, and the agencies by which such intercourse and traffic may be carried on. The commerce of a nation indicates its life and power and the prosperity of the people. There is no commerce where there is nothing to sell, to exchange, or to transport. In this advanced period of civilization, the exchange of products of the soil and of manufactures is essential to the welfare of the human race. The means of exchange must be provided, and every nation has within itself to regulate all the elements and agencies that become necessary to the carrying on of these transactions." Railroads, the committee declares, are everywhere recognized as common carriers, and as such are held liable in the courts for the performance of such duties as devolve upon common carriers under the law. No common carrier has the right under the common law to discriminate between persons or places, or to give preference in any manner. The theory of the common law is that all who are situated alike must be treated alike. Unjust discrimination is the chief cause of complaint against the management of railroads in the conduct of business, and gives rise to much of the pressure upon Congress for regulative limitation. The railroad companies do not recognize as they should the fact that they sustain a different relation to the public from persons engaged in ordinary business enterprises. Railroad companies are not disposed to regard themselves "as holding a public office and bound to the public," as expressed in the ancient law. They do not deal with each citizen alike. They discriminate between persons and between places and the states, and Congress is consequently called on in some way to enforce the plain principles of the common law for the protection of the people against the unlawful conduct of common carriers in carrying on the commerce of the country. "As a common carrier," the committee continues, "and as the privileged manager of the business of transportation upon a public highway, the relations and obligations of the railroad to the community and the governmental authority are essentially different from those of the ordinary corporation which does not enjoy similar exclusive privileges or perform a public function. In the very nature of these distinctions and in the peculiar relations they occasion are to be found the reasons which justify and render necessary the legislative regulation of the railroad corporations engaged in the business of transportation for the public convenience. The state primarily gains its right to exercise such regulation because the railroad proper, as a line of communication, is a public highway, and necessarily subject to the same supervision as any public road, but this right might, perhaps, be restricted to the exercise of the same degree of supervision as roads and highways are subject to, and might not extend to the management of the business carried on by the railroad company if based upon this ground alone, as the state itself in this country has not deemed it advisable to construct and operate this class of highways. That work has been left to private enterprise, and it has been the universal policy, first as a matter of necessity, and since of convenience, to place the construction and management of the railroad in the hands of an artificial person, which assumed the duties of the state in this respect, and in return was authorized to collect tolls to meet the expenses of operation and maintenance, and to yield a reasonable return upon the capital invested.

"The only reason for the existence of railroad corporations is that they might undertake a duty which the state was unable or unwilling to perform, and to that extent they exercise a public function. In the performance of this duty private capital was invested, for the use of which it was proper that due return should be made. It was also necessary to provide in some way for the expenses of maintenance and operation. As the most convenient and equitable method of raising whatever amounts should be needed for these purposes, such corporations have been authorized to collect these amounts from the persons making use of the facilities for transportation afforded by the railroad; or in other words, to place this burden, which must in some way be borne by the people, upon the passengers and freight transported instead of upon the property of the entire community, as other taxes are commonly levied. By granting the railroad corporations authority to thus levy a tax upon commerce, even with the expressed or implied reservation that their charges should be reasonable, they were necessarily given a monopoly of this right, at least so far as their own highways were concerned, and the fact that such a corporation is in the nature of monopoly is a stronger and broader reason why it should be subject to the control and regulation of the state, and widely extends the jurisdiction and rights of the state in that respect. And as the agents of the state in supplying the community with

facilities for transportation, the railroad corporations necessarily rest under the same obligations to deal fairly and equitably with all its citizens, without favoritism or discrimination, as the state itself. The public nature of these corporations has been uniformly maintained by the courts and legislatures of the several states.

These principles are well settled since the decisions by the United States Supreme Court in the *Grainger* cases brought the railroads to a realizing sense of their obligations. But when we consider the imperial influence which these most mighty engines of civilization exercise upon the development, progress, and commerce of the country, making possible the ruin or prosperity of cities, states, or even larger areas of territory, it becomes evident that the state possesses the right to supervise and regulate the administration of such imperial powers upon the broad ground of public policy, in addition to the fact that a railroad corporation manages a public highway, exercises a public function, and is in the nature of a monopoly." The committee sets forth some of the difficulties of effective state regulation. Any absolute or comprehensive regulation of the railroad system of the United States, it says, would include the official supervision of every step taken from the granting of a charter to the policy of the management after the road begins business. While ample authority for such supervision unquestionably exists, the powers of the state and of the general government are so divided as to make it difficult, if not impracticable, to secure a uniform system of regulation applicable alike in all details to the entire system. While the solution of the problem might be facilitated by giving exclusive jurisdiction over all the operations of railroads to the general government, there is, the committee says, no occasion to consider the necessity of a constitutional amendment until it has been demonstrated by actual trial that the powers now possessed by Congress cannot be exercised effectively. The reckless manner in which railroads are often managed, the committee says, makes it necessary to distinguish between the official management of a railroad which may be governed by selfish considerations of the interests of the managers and the corporation itself as representing the stockholders and investors. The possibility and existence of irresponsible railroad management result, the committee says, in a confusion of ideas and terms that aid in mystifying the railroad problem, and are in themselves so far-reaching in their effects as to call for special consideration. The fact that it has been possible for some of the best railroad properties in the country, possessing no greater natural advantages than are enjoyed by others similarly situated, but less successful, to be so managed as to give occasion for no special complaint from any quarter, and the further fact that as a general rule the smallest proportion of complaints are charged against the more prosperous roads, show that in the railroad business, as in every other, honest and efficient management is the wisest and most profitable.

The subject of competition between waterways and railroads is discussed briefly, and the conclusion is reached that the waterways are the most effective regulators of railway charges, and the emancipation of the waters is a national necessity. The improvement of the Mississippi and its tributaries is briefly alluded to and warmly endorsed. Of the *Hennepin Canal* the committee says that the commerce of the nation would derive fresh and continued advantages from the construction of this canal. "Cheap transportation between Chicago and the seaboard," the report says, "is assured by the line of free water communication open through the great lakes, the Erie Canal, the Hudson, and no method has been suggested by which the controlling influence of that water competition could be extended over so wide, populous, and productive a territory at so moderate an expense as by constructing this short canal of 74 miles, which would give to the people of the Upper Mississippi states direct water transit connection with all the states of the Atlantic seaboard and with Europe. The necessity of this improvement is made more urgent by the high and oppressive rates of freight prevailing between the grain-producing states of the Northwest and Chicago as compared with the charges made between that point and the Atlantic coast. By the construction of this canal these charges would be materially reduced and the grain-producing states would be given that cheap transit which has now become necessary to enable them successfully to place their surplus products in a foreign market."

The two propositions which the committee kept prominently in view throughout the entire investigation were whether any legislation for the regulation of inter-state transportation is necessary or expedient, and, if so, in what manner can the public interest be best subserved by legislation on that subject. It formulates its conclusions (accompanying each with arguments and citations to show the ground upon which they are founded) as follows:

I. The public interest demands regulation of the business of transportation, because in the absence of such regulation, the carrier is practically and actually the sole and final arbiter upon all disputed questions that arise between shipper and carrier as to whether rates are reasonable or unjust discrimination has been practiced.

II. It is the duty of Congress to undertake the regulation of the business of transportation because of admitted abuse of its management and of acknowledged discriminations between persons and places in its practical operation—evils which it is possible to reach and remedy through the exercise of the powers granted by the Constitution to Congress and against which the citizen is entitled to the protection and relief the national authority can alone afford.

III. National legislation is necessary to remedy the evils complained of because the operations of the transportation system are, for the most part, beyond the jurisdiction of the states, and, until Congress acts, not subject to any governmental control in the public interest.

IV. National legislation is also necessary, because the business of transportation is essentially of a nature which requires that uniform system and method of regulation which the national authority can alone prescribe.

V. The failure of Congress to act is an excuse for the attempts made by the railroads to regulate the commerce of the country in their own way and in their own interests by whatever combinations and methods they are able to put into operation.

"That a problem of such magnitude, importance and intricacy can be summarily solved by any master stroke of legislative wisdom is," the committee says, "beyond the bounds of reasonable belief. That the railroads, unaided or unrestrained, can or will eventually work out its solution, seems highly improbable, judging from past experience, and cannot reasonably be expected. That a satisfactory solution of the problem can ever be secured without the aid of wise legislation," the committee does not believe. The committee states the essence of the complaints against the railroads, which it finds are based principally upon the practice of discrimination. It devotes several pages of its report to a consideration of the principles upon which rates should be established and the limitations within which discrimination may be justifiable. It declares that publicity is the best remedy for unjust discrimination, and recommends the posting of rates under the direction of a commission. The concluding chapter embodies a recommendation for the establishment of a national commission to enforce the legislation which the committee recommends.

THE BILL.

The following is a summary which was submitted with the report, but the next day, on motion of Senator Cullom, was recommitted to the committee, so that it is likely to be somewhat modified when it again comes before Congress:

The bill accompanying this report, after specifying the classes of carriers, or rather the kinds of traffic to which the regulations prescribed are to apply, and declaring that all charges made by such carriers shall be reasonable, aims to prohibit every variety of unjust discrimination, to prescribe adequate penalties therefor, and to provide for the enforcement thereof in the courts of the United States. These sections include the requirement that all carriers shall afford reasonable facilities for the interchange of traffic with connecting lines, and the prohibition of a greater charge for a shorter than for a longer distance, except when it can be affirmatively established by the carrier that such charge does not constitute an unjust discrimination. Such common carriers may, however, in special cases be authorized by the commission to charge less for longer than for shorter distances for the transportation of passengers and property. Another section requires all carriers subject to the provisions of the proposed act to file their tariffs and classifications with the Inter-state Commerce Commission, and provides that they shall be posted or otherwise published, but leaves to be determined by the commission the manner of publication and the places at and between which rates shall be published. Provision is made for enforcing the requirements of the commission in these respects through the courts, and for the maintenance of the rates that may be thus published. Provision is also made for the appointment by the President of five commissioners to be confirmed by the Senate, "the commissioners first appointed to continue in office for the term of two, three, four, five and six years respectively, beginning with the first day of July next, not more than three of whom shall be appointed from the same political party." Several sections are devoted to prescribing the duties of the commission and the manner in which complaints are to be investigated and prosecutions instituted under its direction when found necessary. Under these sections it is proposed to give the commission full power to obtain all information necessary to the performance of its duties; to constitute it a board of arbitration for the adjudication of such differences between shippers and carriers as can be amicably settled through its intervention; to make its findings of facts *prima facie* evidence in all legal proceedings, and to provide for the prompt enforcement of its recommendations through the courts, if resort to them should become necessary. The salary of each commissioner is to be \$7,500 per annum.

The Public Concern in Rate Cutting.

The New York Herald of Jan. 18 says:

If the public had no more concern with the trunk line railroads from the Atlantic to the Great Lakes and the Mississippi, nor any more control over them than it has with or over private persons in the conduct of their business, the reckless behavior of two of these lines—the Pennsylvania and the Baltimore & Ohio—in "cutting rates" again last week, nevertheless would warrant a protest. But the public has additional concern and control because all these lines are creatures of corporations which themselves are creatures of the public will, and because the federal constitution gives Congress authority "to regulate commerce among the several states," and therefore the "rate cutting" not only warrants protest, but may speedily demand legislative interference if it is not reformed. * * *

It is the distrust and confusion which "rate cutting" introduces into all the business of the country that depends on transportation to which we would mostly call attention—the detrimental effects on manufacturers who bring the raw material to their mills and send the finished product to market by railroad; on agriculturalists, in the market value of whose crops freight charges are a very large element; on tradesmen in interior cities, whose calculations for the season are broken up by sudden competitions to which they are exposed by variations in freight rates to and from the metropolis, and on the metropolitan merchants, who are affected in like manner. The possible illustrations are innumerable. "Rate-cutting" on the railroads unmakes the fortunes of millions besides the shareholders and bondholders.

We also would direct special attention to the damage of the general welfare of our whole country consequent upon the probable return of American railroad shares and bonds now held abroad. When foreign holders see experience go for nothing, and reckless managers of American railroad corporations in whose securities they have invested now repeat a course amply proved to be ruinous, it is reasonable to suppose that they will make haste to withdraw their capital and throw back their holdings to an amount liable to be very disastrous at a moment when it will coincide with the drain of gold out of the United States, which is sure to be a consequence of the continuance of the Bland dollar coinage. Nor will their withdrawals be limited to the offending roads alone. The innocent also will suffer. The whole American railroad system will be discredited abroad. Our cable dispatch from London concerning the "sharp fall" there in American railroad securities on Saturday is significant of this discredit.

Deplorable at any time, railroad "rate cutting" at this time, in consideration of the condition of the country, is more wicked than many offences which the law stamps with the brand of criminality. Those trunk-line managers who are guilty of this repetition of it know that public opinion condemns them, but they care little when it expends itself in empty denunciations, however vehement. Therefore let public opinion concentrate itself into a definite demand upon Congress for interference as one of the most urgent duties of legislation.

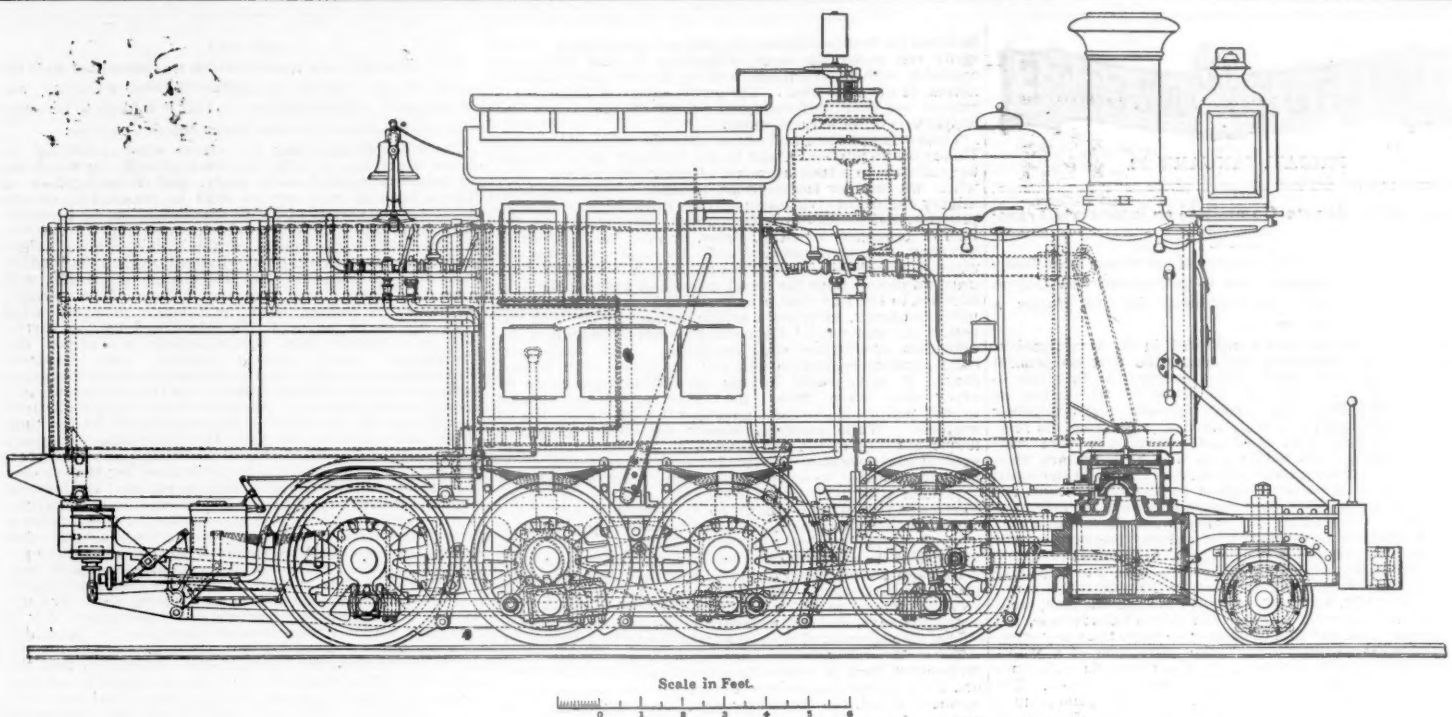
Commenting on the above Mr. Albert Fink said to a Herald reporter:

"I am much pleased with the Herald editorial this morning on the passenger rate war. It is a new departure in the history of New York journalism. I may say it is the best article I have read on the subject. The vast importance of the interests at stake cannot be overestimated. The Herald's position is sound. I have always held the same view, and I know it is right. * * *

SIGNIFICANT FIGURES.

"It is the business of the country and innocent shareholders that suffer most from railroad wars. The present troubles are confined to two roads, and because of their selfishness it is right that the railroads of the country should be drawn into the quarrel, and their bonds depreciated! The railway property of this country amounts to one-seventh of the total of every kind of property held in the United States. * * *

"The fight between the Baltimore & Ohio and the Pennsylvania roads is to determine who shall carry certain business. The fight involves all the other roads, and many lines having nothing whatever to do with the war have to pay a penalty, while innocent stockholders are made to suffer most severely. The passenger earnings of all the roads affected by the cutting



CONSOLIDATION LOCOMOTIVE WITH WOOTTEN FIRE-BOX.

Built by the BALDWIN LOCOMOTIVE WORKS, Philadelphia, for the Calumet & Hecla Mining Co.

of rates by these two lines amount to \$50,000,000 a year. The Baltimore & Ohio wanted to get the use of the Pennsylvania road from Baltimore to New York. The Pennsylvania road was willing to give Mr. Garrett the use of this line permanently, but refused to give it temporarily—that is, until the Baltimore & Ohio should complete its rival lines and get into New York, a fully equipped competitor with the Pennsylvania road. At first the Baltimore & Ohio did have such an arrangement with the Pennsylvania, but that road concluded to break the arrangement in 1884, when they discovered, as they claim, a disposition on the part of the Baltimore & Ohio to parallel their line.

"The question who is right in the quarrel is difficult to decide. Of course each road ought to have the right to control its own property as long as the public is properly served. I think that railroads should establish judicious and equitable tariffs and stand by them. They should not be allowed to make unreasonably low rates to injure other or rival roads, or merely to fight lines with a view of forcing them to yield to their demands, and then when the point has been gained to put up the rates again. Altogether it is a difficult matter to regulate tariff by legislative enactments. The proper way is to submit all questions under dispute to arbitration, to be settled on principles of equity, and to protect innocent parties against unjust losses. It is not lawful for a man to set his house on fire to spite a neighbor at the risk of consuming a whole city.

"The trunk railroads have formed an association to protect themselves against the evil effects of railroad wars. The trunk line compact lately made has this for its object. It provides that all questions arising between parties to the contract that may lead to war shall be settled by arbitration. The Baltimore & Ohio is a party to this agreement so far as freight is concerned, but, unfortunately, not in regard to passenger traffic. The trunk line contract in this instance has had the good effect of keeping the war confined and preventing a general cutting of rates. But for this there would have been a complete demoralization of passenger rates between New York and the West. The total earnings of the roads would have been affected, and each road would have sold tickets at rates to suit itself. The majority of the trunk lines, by acting together, instead of fighting, present a solid front against cutting rates, and they will prevent a general passenger war.

The total passenger earnings of the New York trunk lines are \$26,000,000 a year, \$17,000,000 of which are local earnings, \$9,000,000 are on business that goes to and comes from other roads. Now the earnings involved in the present controversy amount to no more than \$800,000 a year on east and west-bound passengers—that is, between New York and Chicago, St. Louis and Cincinnati—over the seven trunk-line roads. The interests of the Baltimore & Ohio road in this controversy do not exceed \$125,000 a year, even when rates are maintained, and this is the amount they are fighting about at the risk of distributing the \$26,000,000 earnings of the other roads. Some way ought to be found to settle these disputes without imperiling the business of the country and unsettling securities and public confidence. It is almost criminal that so small an interest should be allowed to injuriously affect so great a proportion of the country's wealth.

"In regard to the loss imposed on the weaker lines, that is regulated by the system the pool has organized. The Erie and West Shore roads will be protected. The loss to each will be small in case of a prolonged war, because the receipts are pooled and divided among all the roads, and thus the weak are protected by the strong lines—all helping each other and sustaining the business interests of the country."

Consolidation Locomotive, with Wootten Fire-box.

The accompanying engravings represent a consolidation engine built by the Baldwin Locomotive Works, Philadelphia, for the Calumet & Hecla Mining Co.

The name of the engine is "Kitchigami," which sounds like a mother's term of endearment for her first baby. It is, however, the Indian name for Lake Superior, and is, therefore, appropriate for a locomotive whose daily toil will be upon Keweenaw Island, which is situated on that great lake.

The engine is fitted with the Wootten system of fire-box, and though built for a narrow-gauge line, has slightly more tractive power than most consolidation engines, and considerably greater weight, being the heaviest consolidation engine ever built for any gauge by the Baldwin Locomotive

Works. The following are the leading particulars and dimensions of the engine:

Cylinders, diameter and stroke	20 in. x 28 in.
Tractive force per lb. average pressure in cylinders	208 lbs.
Gauge	4 ft. 1 in.
Fuel	Buckwheat or pea anthracite.
Weight in working order, about	130,000 lbs.
Weight on driving-wheels	116,000 "
Total wheel base of engine	21 ft. 9 in.
Driving-wheel base of "	15 ft. 8 in.
Total wheel base of engine and tender	50 ft. 6 in.
Driving-wheels, diameter on tread	50 in.
[Front and back driving-wheels flanged, intermediate wheels plain.]	
Driving-axle journals, diameter and length	7 1/4 in. x 8 1/2 in.
Engine-truck journals	5 in. x 8 in.
Tender journals	3 1/2 in. x 7 in.
Boiler, "Wootten" patent, straight top, of steel	3/8 in. thick.
Diameter of waist of boiler at smoke-box end	60 in.
Fire-box, inside	114 in. long by 95 1/2 in. wide.
Tubes, 204 in number, 2 in. diam.	10 ft. 6 1/2 in. long.
Boiler tested to 200 lbs. per sq. in.; working pressure 100 lbs. per sq. in.	
Boiler lagged with asbestos.	
Variable exhaust, diameter, maximum opening	6 in.
Feed-water, supplied by two Rue Injectors, one No. 9 and one No. 10.	
The brake shoes of the Ross pattern, with bearing on flange of tire and tread inside of track line, but recessed over the part where the wear of the rail naturally comes, so as not to increase the wear of tires at the point where they are worn by the rails.	
The cylinders tapped so that indicator cards may be taken when the engine is put into regular service.	
A steam-gauge attached to the steam-brake pipe, so that the engineer can see just what effective brake pressure he has available.	
Le Chatelier pipe for braking by back pressure on pistons.	
Hudson's patent automatic bell-ringer.	
Relief cocks on steam-chests, operating automatically and by rod running back to cab.	
Boyd's sight feed lubricator for cylinders.	
De Lancey's patent balanced slide valves, with "Allen" ports.	
Reverse quadrant graduated to each inch of cut-off.	
Steam-brake acting on forward side of all driving wheels.	
American steam-brake on tender wheels.	
Height from rail to centre of boiler	7 ft. 5 1/2 in.
" " top	10 ft. 1 1/2 in.
" " stack	15 ft. 2 1/2 in.
Engine truck wheels with steel tires.	
Driving boxes of cast steel.	

The horizontal seams of boiler are butt joints, with inside and outside welt strips riveted in accordance with the standard of the Calumet & Hecla Mining Co., designed by their Chief Engineer, Mr. E. D. Leavitt, and are shown by the accompanying engraving. The circumferential seams are ordinary lap joints double riveted. On account of the great size of the boiler it was impossible to get plates large enough to raise the horizontal seams above the water line. The butt joints are just about on a level with the water line, the top and bottom edges of the inside welt strips being respectively above and below it.

We understand that the "Kitchigami" is doing remarkably well, making abundance of steam and giving great satisfaction.

Contributions.

American Steam Excavators.

BOSTON, Jan. 5, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The interesting illustrated article on the English built steam excavator in your issue of Dec. 13, which is a description of a reproduction of one of the first experimental machines built here more than 30 years ago (but few, if any, of which have been built, of that pattern, for over 25 years), furnishes an opportunity which we are pleased to avail ourselves of, for giving your readers who are connected with railroads and other public improvements, some information as to American steam excavators. There are now over 600 such machines in use on railroads, and they have been instrumental in making a permanent bed for at least three-fourths of the roads in the country.

As we introduced excavators into Great Britain, showing

them the practicability of machines for such purpose when they believed them impracticable, some facts about their introduction into Great Britain may also be of interest.

In 1838, William Smith Otis of Philadelphia built the first practical excavating machine in the United States, which was patented by him the next year. This was the only machine that was put into practical use for 33 years following, until 1871, except that built and patented by Carmichael & Osgood in 1846. During these years we built over 400 of these excavators, which were put in use in the United States.

In 1875 we sent one to Hull, England, at our own risk, for its acceptance, as contractors had no faith in the ability of machines to excavate their hard earth. After an hour's trial they accepted the machine. On the same conditions James Young, a large contractor in Scotland, purchased one.

Acting on the success of our excavators, an English concern constructed a machine in imitation of ours, which proved very defective in operation. After constructing a second machine to remedy these defects, the builder arranged for an exhibition trial for the benefit of the contractors who owned the first one we sent to Scotland and who were in the market for more.

His machine failed completely in the trial and the contractors purchased more of ours. After that time our machines were largely used by contractors in England and Scotland.

The Otis excavator of present construction is very compact, weighing 26 tons, requiring very thorough construction to withstand the constant straining and jarring to which it is subjected. The frame is made of heaviest oak timber, heavily plated with iron, iron frames proving too rigid; just as for railroad ties stone proved less suitable than wood. The gauge is broad, 11 ft., to prevent its tipping when bucket is working in bank at right angles to the machine, or being swung to deposit its load; and it is further provided with jack arms, extending 7 ft. from centre of machine each side, and with wheels of standard railroad gauge, for moving from point to point along the road.

The length of the machine frame is 15 ft., the crane extending a further distance of 17 ft. It is operated on six sections of portable track, of 4 ft. lengths of 8 in. x 8 in. oak with 4 in. x 1 in. iron strap rail, the rear section being brought forward for the machine to move on to as fast as it digs ahead that distance. It excavates through a solid bank 17 ft. high and 34 ft. wide. Various sized scoops are used from 1 1/2 up to 3 cubic yards, according to the hardness of the earth in which it is to be used. The 1 1/2 cubic yard size is most used, as being adapted to general work.

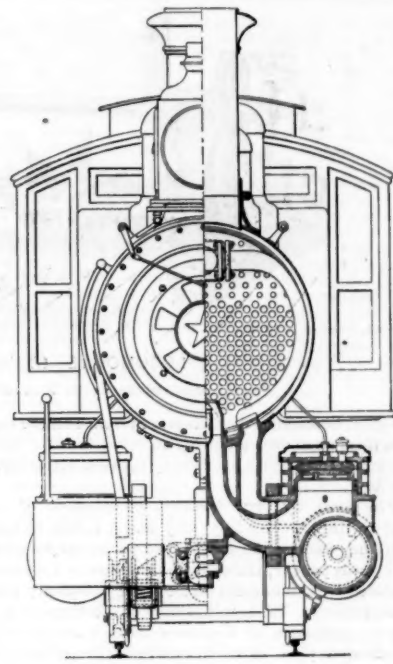
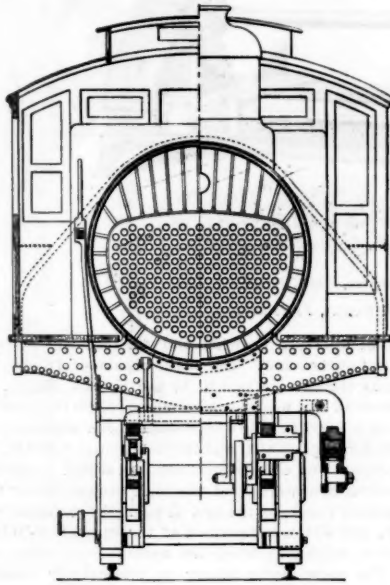
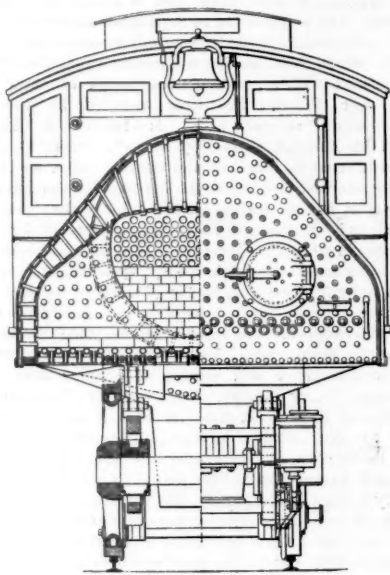
The operation of loading bucket, swinging and depositing can be done in practice twice per minute.

The capacity depends then on the hardness of the material, as the size of bucket used is determined thereby. In hills of compact material it is advisable to make the excavation in benches, working on one bench only as high as the machine will force the bucket through the bank. The following description of work on a big cut on the Reading & Pottsville Railway, which is being built up the Schuylkill Valley, from Reading to New Boston, by the Pennsylvania Railroad, will illustrate the way of working.

"The top level is about 50 ft. above grade, the second is 30 ft., and the third is at grade. The shovels are started in on any one of the levels by making a level plane in the side hill on the line for it to make a start in. Alongside of the track for the shovel is laid a track for the dump cars. This track is kept even with the other, and the cars are run in on it so that when the crane with the shovel bucket swings around at right angles to the track, the bucket will hang over the car. In good shoveling, two buckets-full will fill a car, which is made to carry two cubic yards. The earth is loosened up for the shovel by blasting. This is done whether there is any rock in the cut or not. After the holes have been 'squeezed,' the blasting powder is poured in, 250

CONSOLIDATION ENGINE WITH WOOTTEN FIRE-BOX

Built by the BALDWIN LOCOMOTIVE WORKS, Philadelphia, for the Calumet & Hecla Mining Co.



Scale in Feet.

lbs. for a blast on the upper lift, which is 16 ft. deep, and 900 to 1,000 lbs. for the lower lift, which is 30 ft. deep; fine gravel is tamped down on top of it, and the whole discharged by electricity. A single blast on the upper lift loosens up about 300 yards of earth and one on the lower lift about 3,000 yards. Each one of these shovels can move about 600 cubic yards of earth per day of 11 hours. Three men are necessary to manage the shovel, engineer, fireman and crane-man, but from eight to ten more are at work hauling away full cars and bringing in the empty ones, breaking up large stones, loosening up the earth and stones in the bottom of the excavation where the big blast did not do it, etc. At present one shovel is at work on the upper lift and the other on the lower one, but when the upper lift is finished that shovel will be started in at the other end of the cut and they will try to take the whole 50 or 55 feet at once. This can be done if they don't encounter too many rocks. At present the work is mostly in loose red shale, but there is one stratum of blue rock about 15 ft. thick, which crosses the cut about half way down at an angle of about 45 degrees with the level of the grade."

The excavator works to best advantage, if the bank is compact, in a bank 17 ft. high—that being as high as buckets can be raised. In gravel or sand it can be worked in a bank of indefinite height, as at West Point on the West Shore road, where cuts 100 ft. deep were taken out at one operation.

When the excavations are made solely for the material, nearly or quite 2,000 yards can be excavated in 10 hours—as the best working earth can then be selected and the bank worked to the best advantage for steam shoveling. Such amounts are loaded as 36 cars (of 4 yards capacity) in 23 minutes, and 17 cars in 12½ minutes, the ordinary working being to fill one 4-yard car per minute, or a train of 35 cars in 35 minutes. In gravel work the machine is provided with 2-yard bucket.

The table showing actual results performed by English machines at the end of the published article is singularly incongruous, unless the terms for different kinds of material are very different from what they are in this country. In boulder clay, their figures, obtained from contractors of the output of excavator, are the smallest, viz., 480 yards per day, yet the cost per yard is the smallest (3 cents); and in hard red marl the output of machine is the largest (940 yards), and the cost is more (4 cents). In this country, marl, which we have specimens of, is a very hard substance, and is difficult to excavate. Their figures of output in clay are a third more than in boulder clay, 660 yards, at double the cost.

We subjoin their table, adding the actual output of our machines, taken from contractor's letters:

Kind of cutting.	Material.	Cub. yds. per day.	Cost per cu. yd. cts.	English monthly yardage.	Monthly yardage Otis machine.
Dock work	boulder clay	480	3	12,480	20,000
Railroad "	chalk & flint clay	500	5	13,000	16,000-18,000
Harbor "	clay	600	6	17,160	
Dock "	hard red m'l	940	4	24,440	
Dock "	"	740	5	19,240	

* Messrs. Bayliss & Co. were using our excavator in dock work; probably the same material. They state its capacity 1 wagon per minute (3 cu. yds.) in letter of date July 29, 1875.

The figures we use in boulder clay, against the English figures, are taken from Messrs. Dowling & Kennedy's letter of work now in progress on the Delaware, Lackawanna & Western Railroad. In chalk and flint we quote from Messrs. Ryan & McDonald; Mr. McFadden's figures are the same on the Pottsville & Reading work. This shows all our statements to be from actual averages on large works.

Without presenting figures of cost of operation, it is evident that machinery weighing 26 tons can be operated and handled at less expense than those weighing 36 or more tons.

The men required are an engineer, cranesman, fireman, and three or four helpers. We present figures of work performed at Ashland, Mass., in gravel, as given us by letter of S. H. Munson, the well-known contractor, in December, 1884:

Month.	Hours worked.	Cubic yards.	Lbs. Cumb. coal.
April.....	184	21,086	19,907
May.....	192	24,865	19,708
June.....	185	23,118	17,442
July.....	211	24,472	20,898
August.....	188	25,819	18,998
September.....	203	24,896	18,530
October.....	181	22,082	16,906

N. C. Munson attests by letter to have excavated 5,000,000 cubic yards in one contract at the rate of 70,000 to 80,000 cubic yards per month, with two excavators.

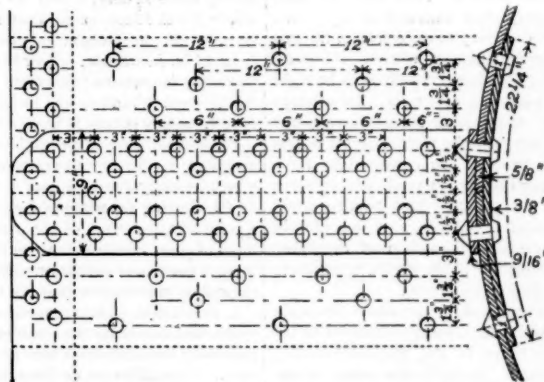
The following table is of work performed last year by an excavator furnished the Canada Southern road in 1872, about 14 years ago, with the disadvantage of having a bank only one-half the height most favorable for working the machine. The cost includes locomotive service, which increases the cost of excavation per yard probably one-third; but this would vary with the length of haul, which is not given. The table, however, shows under unfavorable conditions, even

A superintendent of the West Shore road informs us that they had an opportunity of making a practical comparison with manual labor on their work. The excavator was loading 120 to 150 cars per day (8 buckets per car); in the same pit a force of 150 Italians (at \$1.40 a day) were loading the same number of cars per day.

The same amounts (20,000 yards per month), as in the table above, is being done on Messrs. Dowling & Kennedy's work in a low bank, 5 to 8 ft., as certified to in a letter of date Feb. 5, 1885. We can presume this work to be the same—good working clay—in which laborers will handle from 7 to 10 yards per day, or about one-half the amount we assumed. The letter referred to affords an illustration of how the output is affected by various heights of bank; in stiff clay with boulders, bank 6 to 15 ft., the yardage is larger than in good working clay with bank only 5 to 8 ft.

All the above facts appear to us to make it probable that, under like conditions, the cost of excavating per cubic yard will be 50 per cent. less with our machines than the English excavator.

Concerning other replies in your columns, we cannot see that it is necessary to bring in comparative wages in this country

Longitudinal and Circumferential Seams of Boiler.
CONSOLIDATION ENGINE, BALDWIN LOCOMOTIVE WORKS.

including engine service, results vastly favorable to the excavator:

MONTH.	No. cars gravel.	No. hours delay and cause.			Miles ballasted.	Cost.
		Wait'g cars.	Rain.	Rep. shovel.		
1884.						
Apr. 7 to 30	1,347	32	..	20	8 4,905	\$855.06
May 1 " 31	2,165	44	4	4	14 1,855	831.08
June 1 " 30	2,297	23	10	8	15 1,195	820.08
July 1 " 31	2,917	12	2	20	19 1,785	870.34
Aug. 1 " 31	3,277	9	..	..	21 3,815	869.03
Sept. 1 " 30	3,006	6	..	4	17 420	811.43
Oct. 1 " 31	2,782	4	11	12	15 5,270	866.08
Nov. 1 " 29	2,216	15	..	34	12 3,040	877.33
	20,007	145	27	102	125 1,125	\$6,820.45

[Height of bank, 7 to 9 feet; average No. yards per car, 7½; average cost per yard, 4½ cents. Cost includes coal, oil, waste, repairs and labor, and engine service.]

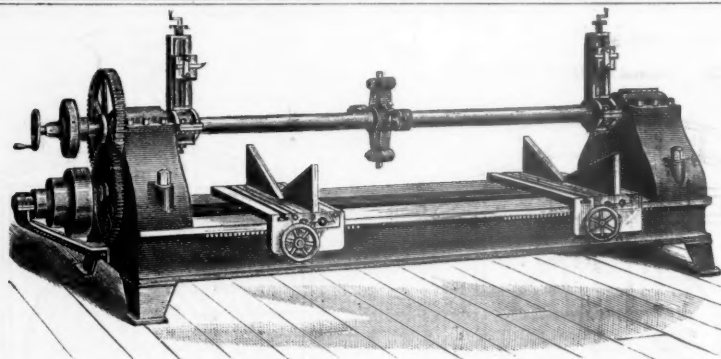
On the construction of the New York, Chicago & St. Louis road, General Casement loaded, on his contract in January, 27,000 yards. The cars were unloaded by steam, the entire force required, operating excavator, engine service and car men, being 18 men.

and England, to prove the merits of American excavators. It is difficult to see what our Northwestern friends, in their letter in your issue of Dec. 25, 1885, wish to establish in their table of prices, in giving totals; the impression is that the total wages for operating excavator is \$10.35. That eight helpers are obtained for \$1.10 per day, or fifteen cents per day each, is not very encouraging for immigration to the Northwest. But perhaps we are too critical.

Our Northwestern friends also make an admission which they argue cannot be questioned, that the English excavator, from its construction (in being able to work through a bank of greater height than 25 ft.), allows more constant operation and larger average output, contrary to the opinion of the Osgood Dredging Co., and of our own.

The English machine is provided with a scoop of same capacity as the American machines. In gathering a bucket load their scoop passes through a 25-ft. bank, ours passes through 17 ft. bank, in doing which and depositing load they require a space of time of three-quarters of a minute, while we make the movement in one-half minute, or three dips to their two (our machine admits of being speeded to three dips per minute).

The apparent slower speed of those machines is due to the fact that their bucket has to be raised to a much greater height in gathering its load. The advantage the American



LOCOMOTIVE CYLINDER BORING MACHINE.

Made by the L. B. FLANDERS MACHINE WORKS, Philadelphia.

machines gain, by making the complete movement more rapidly, gives them an ability (allowing an extra time for moving up) to outdo the English machine by between 400 and 500 yards per day.

The table given by your former correspondent of six months' work (1885) of the Bay City shovel is well enough, but when they reduce the car output per month to cubic yards at 7 yards per car, the labor and expense in removing hills is reduced to a minimum that challenges equality with divine omnipotence. The manifestation of the divine will in removing the mountain of Krakatoa, Java, is on record as being the cheapest piece of earth excavation heretofore performed; according to their table the expense is only a trifle more. The figures are so far ahead of anything we have heard of before, that we should prefer to see them realized in a trial of their machine with one of ours alongside of it.

JOHN SOUTHER & Co.,
Manufacturers of Otis Excavators and Dredges.

The Region of Snow Slides on the Canadian Pacific Railway.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The *Railroad Gazette* of Nov. 27 contains a paragraph upon the snow slides of the Canadian Pacific Railway. The writer has just returned from two years of service as Division Engineer on the Mountain Division of that road, on which division alone were the important snow slides. As a memorandum of the action of such snow slides on a scale probably never before noted, the following detail may have interest, and be of service on future constructions.

On the first range crossed in the Mountain Division, namely, the main range of the Rockies, but little trouble was experienced during the past winter. On the Selkirk Range, west of this, occurred the greatest movement of snow. On the Gold Range, the westernmost range of importance affecting the gradients, the difficulty from snow was limited both in distance and volume.

The road was already constructed over the main Rockies before the coming of the heavy snow fall, and in operation for construction purposes. Contrary to expectation, the line was open and operated throughout last winter. Almost a million dollars' worth of supplies had previously been brought in, in anticipation of a blockade of some length. The attempt to continue construction on the Selkirk Range during last winter proved successful, except on the west slope for a few weeks, when the utmost energies of the construction force were devoted to keeping open the wagon road. The presence of large forces of men on this range, which was formerly shunned even by the Indians after October, gave opportunity for close and continued watching of the action of the slides; in fact, without such watching life in the region would have been somewhat uncomfortable and uncertain.

During the winter the heavy body of moisture from the Pacific, passing over the Gold Range, was precipitated on the Selkirks, leaving the main range of the Rockies a smaller snow fall than was expected. Probably the other ranges than the Selkirks may secure the greater amount of snow some years. This may be a troublesome feature for the operating department, not permitting it to determine before the lapse of many years just where all trouble and blockade may be expected and provided for; also delaying a correct determination of the value of the road financially and as a competing line.

On the main range of the Rockies the line grading up the Bow River and tributary is in an open valley, not likely to be affected by slides; westward for a few miles from the summit the same features continue. But along an extent of from five to ten miles, near Tunnel City, an unusually heavy snow fall would throw many slides of medium size down upon both the present line and on the proposed permanent line that is planned to avoid the existing 4.5 per cent. gradient. Except along this portion, there is but little chance of difficulty in the main Rockies. Possibly for some three miles in the Lower Box Cañon of the Kicking Horse slides may occur, but not coming from a great height or distance, and not of great volume. The slide immediately at Tunnel City may prove a dangerous one, being likely to bring down masses of ice from the glacier overhanging the line for a few hundred feet.

On the Gold Range the danger from slides exists along only a few miles. It is said that some trouble may be found on the line following the Fraser, the roadway being along the face of cliffs, with steep slopes running back from their crests. It is probable, however, that no great precipitation will suddenly occur over these lower altitudes; also that a greater

amount of alternate thawing and freezing will arrest the movement of the snow. The main region of trouble from slides may therefore be said to be the Selkirk Range. Its total snowfall in a winter has been noted as 30 ft. 2 in. Its elevation is 4,300 ft. above approximate sea level, the main Rockies showing 5,300 ft. and the Gold Range 1,800 ft.

The writer was ordered westward to attend to locations and construction surveys of the high bridges, Stony Creek and Surprise Creek, on the east slope of the Selkirks, about Oct. 27, and did not pass west of the summit until late in November, although visiting the summit once in the meantime. The snow began falling in considerable quantities early in October; and the small slides in the neighborhood of the summit, thrown down from the immediately adjoining steep slopes of mountain tops, were numerous. They were either by continuous sifting down of thin sheets of dry snow, or by the rolling of balls of snow from the size of the fist to the size of a man's head, coming from 1,000 to 2,000 ft. above, and accumulating at the snow base to a depth of 10 to 15 ft. These runs of snow would not cause a long continued blockade, even in a shallow through cut, but would involve, at a score of places, pretty steady work of gangs larger than ordinary section gangs. Late in November over 5 ft. of snow had fallen in the valley bottom at the summit; only a few inches had fallen at Surprise Creek, 10 miles east of the summit; but at least 4 ft. had fallen at a point 18 miles west of the summit, not differing greatly in elevation from Surprise Creek. The number of places at which the small slides were troubling the line had not increased much; and the probability is that until the coming of the great slides late in December the Canadian Pacific road (as on the Northern Pacific) will find in the mountains almost no trouble from snow. The absence of wind both in the Clark's Fork of Columbia on the Northern Pacific Road, and in the Ille-cillewalit and Kicking Horse valleys, on the Canadian Pacific road, during the winter will always leave these portions of the roads named easy to operate, apart from snow slides. (The writer has personally noted this freedom from trouble by snow, on several transcontinental lines, in the region of heaviest fall, having suffered delays from 10 in. of snow fall along the windy North Platte longer than from 10 ft. on the Sierras, from 8 in. in Oregon on the Navigation Co.'s line and from 12 in. in Dakota, longer than from anything in the intervening mountains; and from a few inches of fresh snow fall between Winnipeg and Calgary on the Canadian Pacific than from any delays in the Rockies.)

The serious slides of the Selkirks did not occur last winter until Jan. 8. There had previously been a gradual snowfall, which by early January may have reached a total of about 12 ft. During the night of Jan. 7, 23 in. fell, as measured at a point 20 miles west of the summit; and a general movement of snow occurred both on the more prominent and the smaller peaks and mountain sides, causing every variety of snow slide noted below (but not in the form of slush).

1. Small local slides from the upper slopes of the nearer peaks, and following the small ravines. The snow in falling gradually accumulates a cone of earth and rock debris at its base. These slides occur frequently in small quantities, and would probably not cause great damage to the roadway, and the latter could be kept open; but the chances for sudden accident are great, and generally no shifting of line can be made at any reasonable expense to secure tunneling or proper cutting for sheds, owing to the short and abrupt nature of these small ravines. The passengers will always be running amuck at such places, and the chances be great for derailment or collision.

2. The hillside slides, of long extent, from the local slopes not from a distance. These occur frequently, but seldom bring down much debris with them. In many cases the small bushes (evergreens, alder or berries) are not injured by these slides. Where the line can be sunk into cuttings of sufficient depth shedding will pass these slides. They are distinct from the lower hillside movement of the great slides mentioned below. (The shedding of the Central Pacific, where intended for slides and not for quiet down-fall, is largely for this class of slide; but much of the shedding of that road, so often and prominently mentioned, is of the "corn-crib" pattern, intended for simple down-fall too deep to be easily managed by plows, and would be quickly demolished by an ordinary slide.)

3. The great slides, accumulating at the high peaks, one to six miles away, and coming with incredible speed and resistless force along the lateral valleys. In some cases the snow probably averaged an eighth of a mile wide and over, and over 30 ft. deep during the movement, piling up in the main valley to a perpendicular depth of 200 ft., with the cone of diminishing depth reaching, perhaps, a half mile up the

lateral valley, and the base sometimes forced up the opposing side of the main valley 300 to 400 ft. The timber of all sizes is mowed off like straw wherever these slides deviate from the regular channel or reach an unusual distance up the opposing slope of valley, and is ground into small fragments. The writer noted in September an arch of last winter's snow and ice made by a lateral stream in the cone of one slide, which was bearing fragments of rock over 25 tons of calculated weight; the general depth of snow remaining over 50 ft. The time occupied by these slides in coming several miles is hardly to be measured by minutes, rather by seconds. There is not time, after hearing the sound of the starting miles away, to run many hundred feet before the slide reaches the main valley. The most serious feature is the force of the accompanying wind, as it sometimes deviates from the line of slide, always reaches in advance beyond the foot of slide, and is as destructive sometimes as the slide itself. Wide swathes have been mowed by it in standing timber of trees several feet in diameter, in one case believed to be a mile in advance of where the slide stopped. The wind from one slide diverged when near the main valley, leaving the slide at nearly 30 degrees divergence and cutting a channel 300 ft. wide through heavy timber. The varying direction of the course of these great slides is also a most serious feature to deal with. A slight difference of location of the gathering of snow, far up the peak, will cause the slide to cross the middle ground by a different one of the many ravines existing there, and will throw it upon a widely different part of the lower slopes of the main valley. Along the main valley for a distance of 15 to 20 miles on each side of the Selkirk summit are great numbers of trenches, 100 to 500 ft. wide, cut through the old timber on the lower slopes, the trees left standing between these trenches being 2 to 4 ft in diameter. A serious feature is that perhaps for 50 years or more (as indicated by such timber) it will be impossible to say in just what portions of the line the slides may or may not come. Even if secure sheds could be provided at special places by sinking the line into cuttings, the extent along which these slides may come (a large proportion of 40 miles distance) would require an outlay entirely impracticable. Still there may be many years in which no precipitation may occur on this range sufficient to bring down the slides at many of these places. During last winter only one of very great size occurred on the east slope, at Raspberry Creek, somewhat over 10 miles east of the summit. No change of line has yet been made here sufficient to prevent interruption of travel at the next slide. Many slides occurred a few miles east of the summit. West of the summit the line was entirely relocated, hoping to avoid the worst of the great slides of last winter, raising grades in places several hundred feet above the valley bottom, crossing it elsewhere a dozen times, and introducing a "loop" or "S" several miles in length.

The slides were in general more serious on the northerly side of the main valley, and were usually more frequent in the afternoons; an unusually heavy snowfall, however, bringing them down at any hour. In some cases they were probably started by fragments of glaciers, by wild animals (once by a venturesome hunter pursuing a grizzly). In the spring, fragments of rock detached by frost and thaw caused them. Generally they were due to mere weight of snow. Later on in the spring the snow came pouring down in the form of slush, very heavy, but seldom in large masses. The great slides gave but little trouble so late as this, but the small slides, especially of class No. 1, became very dangerous. In one case a mass of this heavy snow came down somewhat earlier in the winter, ploughing a great trench, 30 ft. deep and of considerable width, in the former snow of the slide, and compressing the sides of the trench into walls of solid ice. In other cases great masses of the slush move very slowly, but, of course, with great pressure. The writer has seen one rapid slide of wet snow from a lateral valley, coming with great velocity, strike in the main valley a tongue of solid rock 190 ft. high, and the splash from the slide scattered to a height of 400 ft. up the opposite slope of the main valley, no timber being left standing. In the early, dry slides the "flurry" of snow spread many thousand feet on each side of the slide, and settled over the ground often as deep as 4 or 5 ft. The Denver & Rio Grande has had one of these great slides, besides many smaller ones, but not on the main line. They have succeeded in shedding where the line could be deep in solid rock.

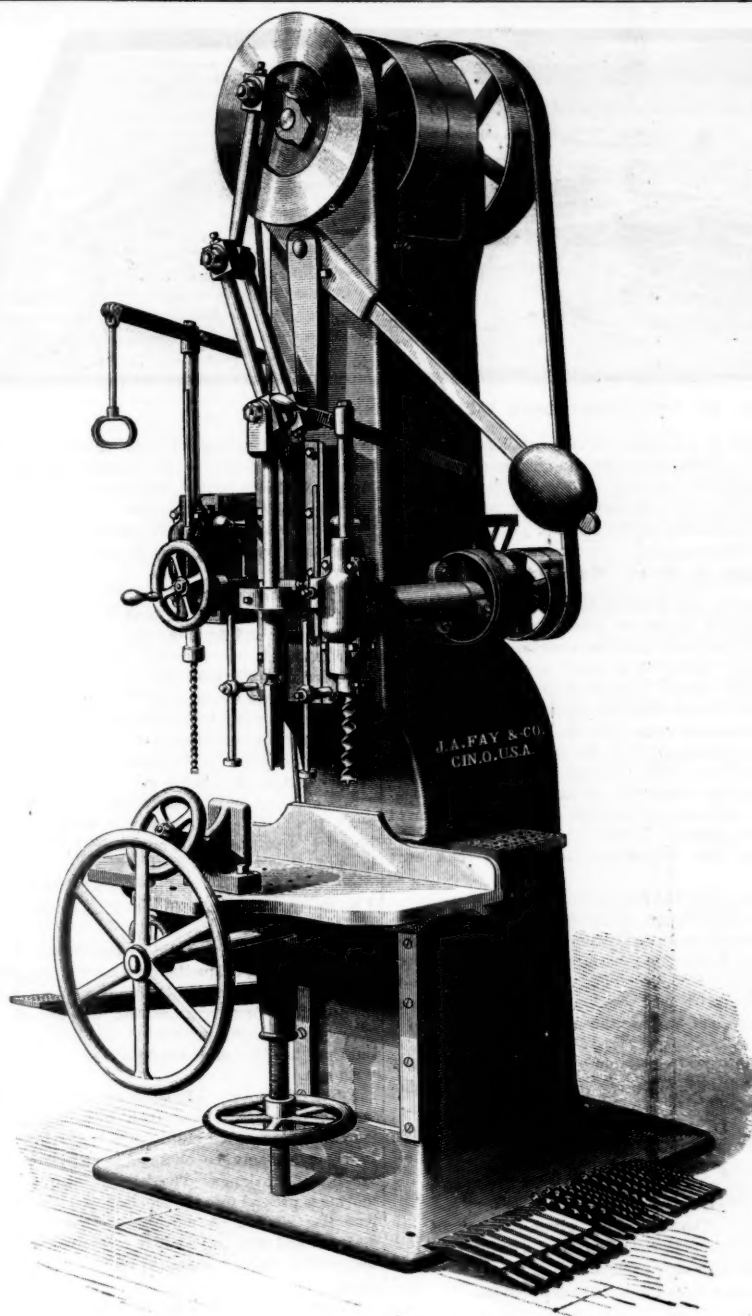
The paragraph in the *Railroad Gazette* about the directors watching the action of the snowslides is certainly entertaining. The directors who will remain and watch in that country will be few. It is expected that three or four engineers will be provided for and left on the range to attempt such watching and to test one or two snow sheds. No one, however, without an immense force of laborers to keep a roadway open, can venture to move to and fro along any great distance often enough to secure further information of much value. The experience gained will be chiefly by viewing the wreck after spring is well advanced and in paying the bills for renewals then.

ARCHIBALD A. SCHENCK.

Cylinder Boring Machine.

The accompanying illustration represents a form of locomotive cylinder boring machine lately put upon the market by the L. B. Flanders Machine Works, Philadelphia. It is designed as a moderate-priced machine capable of doing new work.

The machine will bore cylinders from 8 in. to 22 in. diameter, facing off the ends and boring at the same time. The flanges are turned afterward. As the saddle that the cylinder is fastened to has a movement of several inches either way, a bent tool is placed in the facing head, and the



LARGE CAR MORTISING AND BORING MACHINE.

(With Auxiliary Boring Attachment and Regular and Graduated Stroke).

Built by J. A. FAY & Co., Cincinnati, Ohio.

cylinder is moved. The vees that hold the cylinder are each independent and adjustable, allowing any shaped cylinder to be quickly brought central. The clamping device is one of the principal features of the machine, and consists of a detachable link chain that can be lengthened or shortened, holding the cylinder, and allowing very little opportunity for springing. When one collar screw is loosened, the bar can be pulled clear of the cylinder, and shoved into its place after the cylinder is placed on the vees. The feed-casing on the end of the bar contains gearing that admits of several changes to suit the work. This gearing is driven by a four-step cone. The head or bar support on the opposite end of the driving gear slides on the shears to accommodate different lengths of cylinders.

Messrs. Pedrick & Ayer, the proprietors of the L. B. Flanders Machine Works, have endeavored to produce a strong, neat and powerful machine that will be found valuable in railroad and locomotive building shops.

Large Car Mortising and Boring Machine.

The accompanying illustration represents a machine specially designed for car work, and termed by the makers, Messrs. J. A. Fay & Co., of Cincinnati, a No. 6 Large Patent Car Mortising and Boring Machine.

This is a special heavy machine, erected from new designs, and adapted for the heaviest description of car and bridge work, being capable of cutting a $2\frac{1}{2}$ -in. mortise through a 12-in. timber.

It is constructed upon a hollow column of very strong section, having a broad base, upon which it stands firmly upon the floor, and with every part so attached to and supported on the main column that no attachments to the building are necessary. The driving pulleys are placed between the bearings instead of being overhung, as is the case with some machines, which adds materially to its capacity and power.

The chisel bar has a perfectly graduated stroke, commencing at a still point above the extreme upper throw and working gradually down into the mortise with little perceptible

jar to the foot, under control of the operator, without slides or levers, and with one-half the joints usually employed in machines of this class.

The bed will receive timber up to 17 in. square, and the chisel will beat a mortise to the centre of 12 in. and 6 in. deep, or, by changing the face of the stick, it can be made to work clear through.

The bed or table is supported on a central screw, by which means the thrust or blow of the chisel is terminated to the foundation, and does not fall upon the table bracket.

It has two boring attachments, arranged in a novel and compact manner, one on a line with the chisel to bore for the mortises, which will bore to 10 in. from the centre of column; also, an adjustable auxiliary attachment for boring bolt holes through 14 in. material. Both boring attachments are driven direct from the countershaft in the machine.

Every joint in the graduated movement is bored and turned and is compensating, and all pieces should last years with care and skillful use. A large number in use in the principal railroad and car shops of the country attest the value and character of the machine, which is warranted to give the highest satisfaction.

New England Railroad Club on Steel and Iron for Locomotive Work.

A discussion on "The Relative Merits of Steel and Iron for Locomotive Construction" took place at the monthly meeting of the Club, held in Boston, Jan. 13. Mr. J. W. Marden occupied the chair.

Mr. J. N. LAUDER (Old Colony) preferred steel for the boiler, fire-box and tires, but considered hammered scrap iron more suitable for piston rods, connecting and parallel rods, crank pins and axles. Steel tires are strong, durable and cheap, but steel axles heat more readily and wear more rapidly than those made of hammered iron, and are therefore not so safe. Steel will not stand intermittent strains of tension and compression as well as iron. The two main driving crank pins exhibited had both broken diagonally from the outer bearing through the collar into the inner bearings. The metal was of a fine and even grain, but the pins had no fillets at the collars. A piston rod had broken about 1 in. from the shoulder on the taper inside the crosshead and about $\frac{1}{4}$ in. from the keyway. It appeared singular that it had yielded midway between the shoulder

and the keyway. In this respect steel did not behave like iron, which gave way at the weakest point. An unbreakable crosshead which will run with cast-iron guides can be made with the cast steel from Chester, Pa., and other places, but this material is really more a fine grade of cast iron than cast steel. Unfortunately steel is very brittle at a low heat. Steel tank sheets were often deeply pitted with corrosion.

Mr. COLEMAN considered that this was due to the low grade of the steel, and the purity of the water.

Mr. G. W. STEVENS (Lake Shore & Michigan Southern): We are using best quality of charcoal No. 1 iron for boiler work and steel for piston rods, with good results. The piston rods are fitted into the crossheads with a taper of $\frac{1}{8}$ in. to 1 in.; there is no shoulder, but after the rod leaves the hole its taper is changed and continued to the outside of the rod. There should never under any circumstances be any shoulder for that is where eight-tenths of the breakages occur.

Mr. GEORGE RICHARDS (Boston & Providence): It is not fair to compare good iron with poor steel. Our steel tires run a far longer mileage than the iron tires formerly used. As an experiment I have bent an iron axle until the ends touched, but on being struck with a hammer the axle broke. The steel axle broke in bending. Steel axles are very generally and very successfully used in England.

Mr. GRIGGS (Providence & Worcester) considered that Krupp steel crank pins were stronger than wrought iron, but should be replaced after a certain mileage. The heating of steel axles is due to their want of porosity.

Mr. LAUDER observed that while the majority of those present considered steel an unsuitable material for axles, the Pennsylvania Railroad, with its corps of experts, skilled in making tests of every kind and description, after years of rare, research and observation, and with a multitude of facts and figures at their disposal, had recently placed a contract for a large lot of steel axles.

New England Railroad Club.

At the next regular meeting of the New England Railroad Club, which will be held at its rooms in Boston on the evening of Wednesday, Feb. 10, it is intended to have a discussion of questions of interest both to master mechanics and car-builders on the one hand, and to engineers and roadmasters on the other. The questions for discussion have been formulated and arranged by Mr. Ford, the Secretary of the Club, as follows:

ROLLING STOCK.	ROADWAY.
Gauge of wheels, maximum and minimum limits each side of flange.	1 Gauge of track, spacing of frogs, throats and guard-rails.
Shape of flange and tread.	2 Section of rail.
True centring of wheels, accurate fitting and mating.	3 True surfacing of track and alignment; true gauge and support of joints.
Neglect and repairs of wheels: sharp flanges; flat wheels.	4 Neglect of track; side-track, switches and frogs.
Length of wheel-base and leeway.	5 Proper allowance for wide gauge and sharp curves.
Independent wheels or slipping.	6 Wear of the surface of rails, effect of sand, etc.
Imperfection of centre motion of trucks.	7 Trouble with frogs and switches on sharp curves.
Effect of the brakes.	8 Wear of the rails.
Car dimensions, width at different heights.	9 Space between tracks and outside of rail.
Car dimensions, length and width.	10 Effect of curves in modifying space for cars.
Car dimensions, height.	11 Maximum head-room afforded above the rails.
Concentrated weight on car truck, axle or wheel.	12 Weight of rail; strength of bridges.
Room for increase and economy of same.	13 Engine weight as a maximum per cent. wear of engine.
Use of middle truck or three-point bearings.	14 Effect of curves, grade changes and bridges.

Engineers and others interested in maintenance of way, master mechanics, master car-builders and all others interested in the above questions are invited to be present at the meeting.

Evaporation from Tanks and Reservoirs.

A paper is now in course of preparation by a member of the American Society of Civil Engineers on the subject of evaporation. A circular from the Secretary of the society expresses anxiety to secure reliable information on the subject, and asks that those who may possess any information on the subject will reply to the following questions, and add any other information in their possession, of which due acknowledgment will be made:

1. Any notes on the evaporation from water-tight reservoirs of any description, stating situation and how the measurements were taken, with any meteorological notes.
2. Any data on the evaporation from tanks or vessels of any kind, stating size and whether floating in water or freely exposed to the air.
3. Records of the loss or gain in a reservoir or other basin during a winter, and notes of any kind on the evaporation from snow or ice surfaces.

In connection with evaporation, notes as to rainfall, temperature of the water surface, humidity of the air, and velocity of the wind are desired.

Information should be sent to J. Bogart, Secretary American Society of Civil Engineers, 127 East Twenty-third street, New York.

Action of Cement under Compression.

A committee of the American Society of Civil Engineers has been appointed to supplement the recent very able and valuable report on a uniform system for tests of cement, by information as to the changes of dimension of cement under various conditions, more particularly in compression. The Committee proposes the following questions, to which answers are desired from all those who may be able to give any, for which full credit will be given in the report:

First.—What is the linear expansion or contraction of cement, neat and when mixed with one, two and three parts by weight of sand (and also of various concretes), during induration and soon after the initial set? (a.) When subject to no extraneous pressure. (b.) When subjected to different pressures. (c.) How affected by the amount of water used, including an examination of grouts.

Second.—What is the measured compression of the same mixtures under various loads within the elastic limit, but including also that under a destructive load, at the following ages? (a.) After one day. (b.) After one week. (c.) After one month. (d.) After six months. (e.) After one year, etc.

Third.—What is the measured compression, within the

* In making these observations the action of induration should be closely observed to determine whether there may not be a preliminary expansion and subsequent contraction, or the reverse.

* It is desirable that briquettes for tensile tests be made from the same mixtures and tested at corresponding times for purposes of comparison.



TOPOGRAPHICAL MODEL OF THE CUMBERLAND VALLEY, PENNSYLVANIA.

elastic limit, or bricks and other lithoidal building materials, and also that under a destructive load?

Fourth.—As incidental to these, and for information only (to be placed in an appendix), what actual compressive strengths have been attained from the mixtures named, and at the several ages under head *Second*?

Fifth.—As another outside inquiry, can you give personal or other well-authenticated experience as to the laying of masonry successfully in frosty weather, and the methods pursued?

The following suggestions are offered as to how observations and tests should be made and the precautions that should be observed:

First.—Measurements may be made over carefully fixed points on masonry in progress, at successive periods of time up to completion; noting thickness and number of joints, loading, character of work, kind of mortar, etc., and temperature at time of measuring. Temperatures should be noted in all experiments in which a change might introduce error into the results obtained.

Second.—Experimental columns may be built, and a series of measurements taken, under the varying conditions heretofore specified.

Third.—Prisms may be made of cylindrical or square section (preferably the former) and of dimension within the capacity of the testing machine at hand, and carefully tested. To insure freedom from lateral flexure, the diameter should be to the length as about 1 to 6, and for uniformity's sake this ratio is recommended.

Various details as to the manner of making tests in testing machines are added.

Replies or communications should be addressed to F. Collingwood, Chairman, care American Society Civil Engineers, 127 East Twenty-third Street, New York, from whom copies of the circular giving full details can be obtained.

Topographical Models.

A recent paper by Mr. A. E. Lehman, Chief Engineer of the Gettysburg & Harrisburg Railroad, before the American Institute of Mining Engineers, gave an interesting description of the manner of constructing topographical models of picturesque or otherwise interesting and important regions, so as to suggest at once to the eye its actual appearance. The accompanying cut, which is not a fancy sketch, but a photographic reproduction by the direct process of the outward appearance of such a model, illustrates the manner in which, and the extent to which, this is possible.

The making of such a model pre-supposes an accurate topographical map, if the model itself is to be accurate; but one can be made or extended, by engineers skilled in such work, at no very large expense. Several different methods of constructing the model from the map exist, which are gone into at length by Mr. Lehman, the most prominent of which is to saw out with a jig-saw thin plates of wood of the exact shape of each contour, or line of uniform level, and then pile them one above the other in their proper positions. The sharp angles are then shaved off to give a smooth surface. From an original so made, any number of copies may be reproduced in plaster or paper.

The practical uses of the system are thus set forth by Mr. Lehman:

"For the graphic display of a railroad system and the territory controlled by it, nothing is better. Railroad companies are just beginning to remark on the advantages of this form of map. The management in considering the development of new territory would be greatly assisted by having it spread out in miniature in this way. Furthermore, as railroad advertising displays, such models have no equal when photographed, lithographed and printed in color. The scheme of employing topographical models for this and other commercial purposes is, I may claim, an original idea and is barely emerging from the domain of science where, heretofore, they seem to have been exclusively used, into the hands of new exploiters, who may expect to receive the commendation of scientific enthusiasts for devoting such work to profane use. The scheme is intended especially as a substitute for the highly-colored lithographic monstrosities displaying recent railroad systems and combinations. The means by which photographic views, of limited size, of models may be reproduced by lithographic process, in colors, on any scale, will readily suggest themselves to practical minds."

The bulk and cost of models is suggested as a reason why the use of the models themselves must always be limited, but it may be questioned if the display of such models of limited picturesque regions in a few prominent localities would not in very many instances prove a more effectual and more economical mode of advertising than many now adopted, as well as a pleasing ornament to the localities where displayed.

The vertical scale of models of this kind is usually exaggerated somewhat, commonly twice, in order to produce to the eye, looking at it from above, the same effect as the actual scene would, looked at from a level. This has been objected to by Prof. J. P. Lesley as "a lie;" but Mr. Lehman urges, as would appear with justice, that no other plan is defensible, because in no other way can the true effect of the actual scene be reproduced. Looking at the actual scene from a balloon a mile or two high would give, it is well known, an entirely false idea of its real appearance, not because what

the eye perceives is not what really exists, but because the senses are not trained to interpret what is seen under such unusual circumstances correctly. Precisely the same argument applies to a model, at least if its purpose be only to represent the appearance of the surface.

Cement Tests on Boston Main Drainage Works.

A recent paper by Mr. Elliot C. Clarke before the American Society of Civil Engineers gave a valuable report of perhaps as exhaustive and complete a series of cement tests as have ever been made on a single work. The immense quantities required for the 17 miles of large sewers and their connected works (some 180,000 bbls.), together with the extreme importance of using only the best of cement for them, naturally required that the manner of inspection should be reduced to a system, and the indefinite and contradictory existing data required, or at least naturally suggested, that this inspection should take somewhat the form of a general investigation. At any rate, many details of the cement question were investigated more fully than ever before.*

The various results of the tests were as follows:

Color affords no indication of quality in itself, but variations in any one given brand are often important indications. With Rosendale a light color generally indicates inferior or under-burned rock. Under-burning of Portland cement is indicated by a yellowish shade and a marked difference of color between that which passes through and is retained by a fine sieve.

Weight per cubic foot varies with packing. Using as a standard the density which a 3-ft. fall gives, average weights were as follows:

Rosendale.....	49 to 56 lbs.
Lime of Tel.....	50 "
Roman.....	54 "
A fine-ground French Portland.....	60 "
English and German Portlands.....	77.5 to 87 "
An American Portland.....	80 "

Fine Grinding.—The following gives the weight per cubic foot of the same German Portland cement with different percentages of coarse particles:

0 per cent. retained by No. 120 sieve—75 lbs.	
10 " " " " " " " " " "	79 "
20 " " " " " " " " " "	82 "
30 " " " " " " " " " "	85 "
40 " " " " " " " " " "	90 "

Color and weight by themselves indicate little, yet considered together and also in connection with fineness, they enable the inspector to guess at the character of a cement, and suggest reasons for high or low breaking. A cement, light in color and weight, and also coarse ground, should be viewed with suspicion.

Sieves are supposed to be numbered by the number of meshes per lineal inch, but as sold, the number is usually some 10 per cent. less than the number of the sieve. A No. 120 sieve marks approximately the limit of size where larger particles are merely useful as sand, and not in the least as cement. It is also about as fine as is practicable to use. The fineness of grinding is a most important point to look after in any cement.

Proportions of Sand.—The strength of the test briquettes made of neat cements did not always indicate the capacity of these cements to bind sand, or the strength of the mortars made with them. The greater the portion of sand in the mortar tested, the more accurately was the actual cementing quality of the cement indicated.

One cement to three sand was adopted as the usual mixture for Portland cements, and 1 to 1½ or 2 or American cements. Rather coarse, clean, sea-beach sand was used.

Manner of Tests.—The manner of mixing and marking the briquettes is given with much detail, but need not be summarized. The initial energy of the cement—that is, the length of time after mixing before it "set"—was determined by noting the length of time before it would bear "the light wire" of ½ in. in diameter loaded with ¼ lb. weight, and also "the heavy wire" ¾ in. in diameter loaded with 1 lb. weight. At the former time the cement was said to have begun to set; and at the latter it was entirely set. Different kinds and brands of cement varied greatly. Some brands of English Roman cement would set in two minutes, and

some of Portland required over 12 hours. Cold retarded the setting, and fresh-ground cements set quicker than older ones. No direct relation was established between initial energy and subsequent strength.

The probable value of an unknown brand could hardly be determined with certainty in less than a month, and not always then.

Effect of Proportion of Sand and of Age.—Fig. 1 gives the comparative strength of neat Portland and Rosendale at various ages, and fig. 2 the same facts for mortars, and also the effect of the size of sand on each. These diagrams are compiled from 25,000 breakings of 20 different brands, and fairly represent average qualities. Individual cements may fall both above and below the average at different ages and under varying conditions.

A Buffalo and a Cumberland cement give nearly the same results as Rosendale in fig. 1.

Size of Sand.—Fig. 2 shows this better than words. Mixed sand, it will be seen, is nearly as good as very coarse. In practice, therefore, it is only necessary to avoid very fine sands.

Size of Briquettes.—Briquettes with a breaking section of 1 in. square and 1½ in. square (2.25 sq. in.) gave essentially the same results.

Kind of Bed.—Elaborate experiments showed that the effect of making briquettes on a marble or glass bed and on a porous bed of plaster or blotting paper was that, making allowance for a few irregularities, the use of a porous bed gives slightly higher results for the first one or two months, but that the difference disappears or becomes insignificant with age.

Effect of Packing.—In experimenting with cements, even when great care is exercised, individual specimens break very irregularly, and results even approximately conforming to theory can only be obtained from averages from a large number of breakings. The degree of force with which the mortar is pressed into the molds is one factor in producing irregular results. A machine for packing the molds was designed and used for a time. It gave somewhat greater uniformity, but not enough to warrant the extra trouble of its use.

Salt water was found to have no important effect upon strength. It retards the first setting somewhat.

Effect of Proportion of Water.—Fig. 3 illustrates the results of extensive tests on this point, each point on each line being the average of 10 tests. The differences in strength due to the amount of water are considerable at first, but diminish greatly with age. The soft mortars, even when semi-fluid like grout attain considerable strength in time.

[The indications of this diagram are to be received with caution as applied to ordinary practice. With laborious and perfect admixture a very stiff paste gives the best results, but with the ordinary mixing of practical work a deficiency of water may well do far more harm by impeding perfect mixture than a freer supply would do directly.—Editor.]

The highest results were obtained by using just enough water thoroughly to dampen the cement, giving the mass the consistency of fresh loam, which became pasty by working with a trowel. Different cements varied in the amounts of water needed. As a rule American cements needed more water than Portland, fine-ground more than coarse, and quick-setting more than slow-setting cements. The standard adopted was 25 per cent. for Portland and 33 per cent. for Rosendale, but these amounts were varied to suit the circumstances, the aim being to obtain mortars of unvarying consistency.

Effect of Fine Grinding.—From the first it was observed that fine-ground cements were less strong when tested neat, and stronger when mixed with sand, than were coarse cements. An example is the following comparison of coarse English Portland cement with a fine-ground French Portland:

Tensile Strength in pounds per square inch at End of 7 Days.

Kind of cement.	Per cent. retained by No. 120 sieve.	Parts sand to 1 cement.				
		0	2	3	4	5
English Portland.....	37	219	125	89	59	43
French Portland.....	13	318	205	130	114	86

Such examples could be multiplied. Different brands of Rosendale varied considerably in their fineness. Those of the best reputation would leave from 4 to 10 per cent. residuum in a No. 50 sieve; other brands would leave in the same sieve from 10 to 23 per cent. The following is a comparison of the average tensile strength of three of the finer

* An English paper on "Testing Portland Cement," by Mr. J. L. Spoor (Engineering, Aug. 14, 1885), and a paper by Geo. J. Specht, C. E., on "The Effect of Sand upon the Strength of Cement," before the Society of Architects and Engineers of Hanover (1883, p. 495-500), furnish data on the same subject, which, while varying in detail, are substantially corroborative of these results, to so great an extent that we need not repeat their conclusions. They do not, however, consider nearly so many details as Mr. Clarke's paper. A valuable report by a committee of the American Society of Civil Engineers on a "Uniform System of Tests for Cement" has not yet been officially published by the Society, so that we cannot use it.



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

NATIONAL RAILROAD REGULATION.

The summary of the report of the Senate Inter-state Transportation Committee indicates it to be largely occupied with a discussion of the powers of Congress and the occasion for exercising them. The committee finds the powers ample and the occasion sufficient to demand action, though it acknowledges that marvelous progress in reducing the cost of transportation has been made by the railroads under the present régime. The chief cause of complaint it finds to be unjust discrimination between persons and places. It believes that the railroads should not be left sole arbiters as to what are reasonable rates and just discriminations, that state tribunals are not sufficient, because of want of jurisdiction over inter-state transportation; and it recommends a national commission of five members, with jurisdiction over the subject, the limitations of which are not clearly shown by the summary published. The bill which was reported by the committee providing for this commission was almost immediately withdrawn, and as it may be modified before it is again reported, it cannot be considered as reflecting the final recommendations of the committee.

There is great danger in all such legislation in trying to do too much before what needs doing has been clearly determined or effective means of doing it discovered. A national tribunal can, it may safely be affirmed, never determine safely the policies which the railroads shall pursue, and it will be doing all that can be asked of it and all that can be required by deciding in specific cases what acts of the railroads are unjust and call for prohibition by the national government. If its approval is required beforehand, it will simply be impossible for it to get through its work, and it will almost certainly prove an obstacle to progress, which is attained by manifold experiments designed by many and diverse minds, the results of which can only be ascertained by trial. It is just as impossible, often, to determine beforehand whether a proposed policy will result in an unjust discrimination, as to decide whether it will be profitable. When some injustice is shown to have been caused is time enough to prohibit it, and for such action the provision of national and other tribunals, expert in the special questions involved, judical in composition and methods, before which cases may be easily, cheaply and quickly tried, is desirable. They would soon doubtless evolve some general principles which should never be violated in making railroad rates, but they would be few in number, for most of what, after a little study, seem principles of general application, are found by experience to require numerous exceptions in the interests of the community as well as the railroads.

Let us imagine that a tribunal had been set up in the early days of railroads whose approval was required for all changes in rates, inter-state or other. Even if such a tribunal had consisted of men of great ability and fairness, it would probably have very greatly checked the rational development of the transportation business, prevented the great reduction of rates which has been one of the wonders of the age, and a prime factor in the development of this country,

and caused vast territories, now peopled by millions, to remain little better than a wilderness; it would doubtless have prevented some evils, but it would have done even this better by judgments when actual cases occurred than by attempting to decide what would be an injustice and prohibiting it beforehand.

Almost every valuable institution is a development rather than a creation, and is the result of the free efforts of people to avoid what is harmful to them or attain what is desirable. Wise legislation utilizes these natural growths, and wise railroad legislation should utilize the institutions which the natural development of railroad business has created. The rates and regulations for by far the larger part of the inter-state commerce are now arranged by associations of the railroads, which through them endeavor to act uniformly. It is one of the chief objects of the national legislation proposed to secure such uniform action, and it would, therefore, seem natural and advantageous that a national tribunal should deal with them directly; that these associations should receive the sanction of law, and be held responsible to the public for their action. There is a curious hesitation about this, caused apparently by the feeling that, somehow unrestricted competition should be encouraged, when every evil complained of is the result of such competition, and neither state nor national government has the slightest warrant for meddling with railroad charges any more than with merchants' charges unless railroad business is to some extent withdrawn from the ordinary effects of competition. Congress proposes by its laws to forbid the railroads doing whatever they please, and it is not to be expected, if it sanctions and deals with associations of the railroads, that it will leave them free to do whatever they please. It can put restrictions on the associations as easily as on the individual railroads, and execute them very much easier. There are, for instance, about 125 railroads carrying the traffic on which rates are made through Mr. Fink's office. How much easier for an Inter-State Commission to deal with these 125 at once through one agent than through 125 agents, and it certainly cannot justly refuse any a hearing in a matter involving its interests.

There is a fallacy involved in the very idea of maintaining competition for through traffic, and uniform rates and publicity at the same time. No one ever cut a rate without hoping, by keeping it secret, to get a larger share of the traffic in this way, from certain shippers who otherwise would send their freight by rival roads. Now, the Cullom Committee purposes to forbid rates lower to one shipper than to another, and to enforce publicity in rates. When, therefore, a company's agent makes a contract with a Chicago packer to carry his provisions for 28 cents instead of what has been the regular rate of 30 cents, it must at once take the shipments of everybody else at that rate, and give public notice to that effect; and of course the next moment every other carrier will give the same notice. That is, with publicity and uniformity enforced, every reduction of rates must be a universal reduction of rates, no carrier will gain any advantage to himself by making a reduction, and therefore none will make one except when the interest of the carriers as a whole demands it. Practically, to require uniformity and publicity in rates is to prohibit competition, and yet legislators are found attempting to encourage the competition while requiring uniformity. We shall never make any headway in rational railroad legislation until the incompatibility of the two policies is recognized, and we cease to rely for protection on a resource which has been removed.

The Atchison, Topeka & Santa Fe Programme for Kansas Extensions.

The Atchison, Topeka & Santa Fe proposes to its stockholders that they supply capital for the construction of about 450 miles of new railroad in Kansas, not directly by the company itself, which would add considerably to its fixed charges, but indirectly through a second corporation, the Chicago, Kansas & Western, the whole of the stock of which will be owned by the Atchison Company, the arrangement being very much like that between the Chicago, Burlington & Quincy and the Chicago, Burlington & Northern—that is, there is just enough connection between the two to make it easy to float the securities of the new company, though the old one is responsible for them only to the extent of the earnings, or part of the earnings, which the new roads bring—the Atchison promising a rebate of 10 per cent. on its gross earnings from traffic interchanged toward paying the mortgage interest, in case the new road does not earn it all. This is an arrangement by which the old company runs no risks. In no event can it be required to pay anything

more than the profits which the new road brings. But investors, nevertheless, have reason to believe that it will not readily let the new company become bankrupt, because in that case it might lose the control which its possession of the stock gives it. There are plenty of instances where, under such circumstances, a company has paid millions to meet fixed charges and make improvements of roads controlled through stock ownership, though it could not be compelled to pay a dollar. This has been done, usually, not merely because the new road at the time was considered a source of profit, but because it was believed that in time it would be able to pay for these advances and dividends on the stock held besides. Otherwise there would not be much inducement to take the bonds of the new companies, whose lines are on the thinly-peopled border, and whose profitability, at least for the first few years of their existence, cannot be assured.

One might suppose that such a method of financing would discredit the new enterprises. The Atchison, Topeka & Santa Fe can borrow money on better terms than the just born and unproved Chicago, Kansas & Western. The Atchison, Topeka & Santa Fe can borrow money on first-mortgage bonds at less than 5 per cent.; the Chicago, Kansas & Western throws in an income bond for \$500 with every \$1,000 mortgage bond taken at par. So, if the Atchison should build the proposed new roads directly, the yearly charges coming before dividends would probably be not more than \$265,000; while by the plan adopted these charges will be \$504,000—\$315,000 of it the first-mortgage interest.

But it must not be overlooked that the scheme adopted, though requiring higher prior charges, turns them all over to the Atchison stockholders, for they exclusively are given the privilege of subscribing on those terms for the new company's bonds. It is considered a valuable privilege, and the rights to subscribe are selling at about \$1.65 per share—more than a quarter's dividend.

One remarkable thing about the proposal made to the Atchison stockholders is, that while they are invited to invest \$6,300,000 in the new company's securities, they are not told what railroad it will be secured by, any further than that it will be "through some of the best and most improving territory in Kansas." It certainly requires a good deal of faith to lend money on such a vaguely described property, yet to be created; and it is entirely due to confidence in their directors that the Atchison stockholders are accepting the invitation to subscribe, and that others are paying them \$1.65 a share for their right to subscribe. Kansas has not always been so safe a field for the investment of railroad capital as to make one feel sure that any railroad built there will pay interest on its cost from the beginning. Indeed, about ten years ago, we believe that every railroad in that state was in default, except one which had never been able to sell any bonds.

There has truly been a great change since. The area under cultivation has been immensely increased, and the crops for several years have been above the average in the West. But meanwhile the eastern third or half of the state has been gridironed with railroads, and there are few purely agricultural districts where railroads are as near together as in much of this comparatively new state.

They are so plentiful in that part of the state that it is not probable that any considerable part of the 450 miles to be built by the Chicago, Kansas & Western will be there.

If we look at the map of Kansas, we shall see that while there is a dense net-work of railroads in the eastern half of the state, there are but few in the western half—the main lines of the Atchison, Topeka & Santa Fe and the Kansas Pacific extend entirely across to the Colorado line, and the "Central Branch," worked by the Missouri Pacific, lacks more than 100 miles of it, and further north the Chicago, Burlington & Quincy has recently built a branch over from Nebraska. Altogether, the western half of the state, having an area of about 40,000 square miles, has but about 750 miles of railroad, while the eastern half has some 3,600. There is, therefore, plenty of room left in Kansas for 450 miles of new railroad.

There has, however, until recently been little there but space and cattle to support a railroad. By the census of 1880 the western 45 counties—including a territory 198 miles long from east to west by 207 from north to south—had but 125,660 inhabitants, and the eastern half 870,436; and in the western fourth of the state only 11,396 people were counted. The change was quite rapid from the eastern agricultural to the western grazing country. The tier of counties next east of the line between towns X. and XI, west of the sixth principal meridian (about longitude 98° 30' west from Greenwich) had about the average population of the state, the eight of them having 79,408 inhabitants;

the next tier west had 53,132 (the first tier of the western half), the next 39,438, followed by 21,754, 7,825, 2,597, and, in the western tier, 914.

Within the past few years there has been a great growth in these thinly-peopled counties west of the centre of the state which it was not long ago supposed would be almost exclusively grazing counties. Settlers had gone there shortly after 1870, but their farming had been disastrous in so many cases that, though much of the land was near railroads, very few people had been induced to go there as late as in 1880, though good land further east already commanded a considerable price. But there has been for several years recently rain enough in much of this country to make agriculture profitable, and the disappearance of government land further east has attracted a very considerable population, which seems likely to increase until all the land is occupied which is capable of returning on the average some profit to the cultivator. Most of it can be had for nothing, and if it can be made to be worth even a very few dollars per acre, it will be worth taking. It is here probably that the Atchison will put most of its new lines. Between it and the Kansas Pacific on the north the distance is from 36 to 90 miles, and south of it, it is 40 to 90 miles to the Indian Territory. It has already two east-and-west lines south of it, extending to the western half of the state, and it will not be necessary that all the country should be cultivable in order to produce enough to support 450 miles of new railroad. The proposed system has the great merit of low fixed charges, as they will amount to but \$700 per mile yearly. Moreover, when such a country begins to produce enough to support railroads, it is sure to get them, and it is, of course, important to the Atchison that these new lines should feed its old system.

The Lesson of a Fortunate Accident.

The remarkable escape of a derailed train on the Long Branch line of the Reading road, on Thursday of last week, from being plunged into a deep ravine from a trestle 49 ft. high, is worthy of notice in more than one way. The immediate cause of the fortunate result appears to have been General Grant, and one or two other prominent individuals less known to fame, whose injury or death in an accident of a similar nature, at Parker's Creek on the same road, two or three years ago, caused all the bridges to be protected with heavy oaken guard-rails. Many years ago—in fact, in the earlier years of the railroad era—*Punch* published a cartoon entitled (we quote from memory) "How to prevent accidents: 'Tie a director to each locomotive,'" and the director was pictured, squirming and frightened, firmly bound with ropes to the engine. It is possible, of course, in this case, that had two ordinary mortals been in the place of General Grant and Commodore Garrison's son in the prior accident referred to, the subsequent precautions would still have been taken, but from the fact that, although "heavy oak string-pieces" were added on all the bridges, a still greater safeguard was not adopted, then or since, we judge the contrary.

It is a pity that, at some time in his career, General Grant's life could not have been saved, as so many others have been, at various times, by Latimer's re-railing bridge safety-guard, or some of the equivalent devices, for in that case those who were last week in such deadly peril would probably have escaped it, and those who are this week or next week to meet their doom somewhere for lack of it, would be spared their lives. In the light of this accident and in the words of Daniel Webster, therefore, the trackman's motto may well be—no such miserable interrogatory as "What are safety-frogs worth?" nor those other words of delusion and folly, "Guard-rails first, and safety-frogs afterward," but everywhere, "spread all over in characters of living light," that other motto, dear to every intelligent trackman's heart, "Safety-frogs AND guard-rails, now and forever, one and inseparable!"

We would not appear to treat the subject in too light a vein. The moral is again enforced in this accident, as it is in hundreds of others every year, that the common neglect of this cheap defense of railroad trains—this watchman who costs so little to buy and who never dies, never sleeps nor eats, nor strikes nor asks for pay, is not creditable, nor fairly excusable. A few thousand dollars will, in most cases, equip a long road with them at every opening in the track, and there is this strong argument for them among many others, that as water runs down hill, they are apt to lie at or near to the foot of grades, where derailments are particularly liable to occur. There are probably few roads on which accidents in the recent past cannot be recalled which would almost certainly have been avoided by them, with a saving great enough to equip the whole line with them. One

such, of a remarkable character, was recorded in our issue of Feb. 20, 1885.

In this particular accident the derailment appears to have been due to some defect in a crossing which is so near to the trestle over which the train was dragged, that by the time a passenger in the car behind the one first derailed could pull the bell-rope the whole train was on the trestle, which was not a very long one, but was 40 ft. deep in the middle. Fortunately, no attention was paid to this signal, but the engineer put on more steam instead of shutting off, so that beyond pulling out the rear truck from under the rear car no harm was done, and when the train was stopped, immediately beyond the trestle, the three front cars, which were those first derailed, had of themselves regained the track.

The advantages gained by maintaining high speed were two: in the first place, any unsupported body begins to fall with great slowness, and in bouncing over the ties at high speed the wheels would not sink as deep as the opening permitted and would only sink in between them one-fourth as far as if the speed were half as great, and one-ninth as far as if it were one-third as great. This alone would make a great difference, but the chief advantage of the high speed, beyond question, is that the wheels and trucks are, so to speak, fired over the obstructions, as a candle may be fired through an oak plank, because the tendency of the body to move forward is too great to be checked by the resistance of the obstructions, within the time available for doing so, and they continue to move in a nearly straight path. It appears from the accounts which have reached us that in this accident, as might be expected, the wheels and trucks continued in a tolerably straight course, cutting deep furrows in the ties, but only impinging to a limited extent on the guard-rails, from which most of them quickly rebounded. At slower speed, and with the speed of the trucks being checked by the car-bodies, so as partially to relieve the front wheels of load, they would more probably have been completely diverted from their path.

The results in this case are in accordance with the usual law in cases of derailment. The normal tendency of the truck, even when derailed, is to continue in motion in a straight line, and even when considerably askew, experience shows that it will generally continue moving parallel with the car-body for a considerable distance without much evidence of resistance to motion in that direction; and theory shows that, however much the truck may be slewed, if the impacts to each wheel are equal and equally frequent, they produce no tendency to slew further.

What, then, produces the catastrophe which almost invariably occurs? Simply this: that the track is rougher on the outside of the rails than on the inside, and near the end of the ties, so that at last some particularly violent impact or disturbance comes to the outside wheels. This gives the truck a slew which will no longer permit it to move along in the path of the car-body, and, instantly, there is general destruction. The office performed by the guard-rails on a bridge, then, is this: They restrain the slewing *within limits*, at the few points where the wheels impinge forcibly against them in the effort to twist more out of line, usually giving it a sufficient diversion in the opposite direction to prevent its impinging on them again for a considerable distance. This may be seen by the marks of derailed wheels on any bridge guard-rails, where they rarely drag along against the guard-rail with an equal pressure for more than a few feet at a time.

This same office, it has been suggested in former articles in these columns, may be accomplished within the car itself by suitably attached check-chains. A patent to accomplish this end has recently been taken out by a Canadian railroad man and some interesting practical trials made, tending strongly to support the views heretofore advanced,* which we hope shortly to summarize and discuss. In the mean time there is food for much reflection in the fact that here was an accident in which the presence of a long viaduct immediately adjacent to the point of derailment, while an element of possible danger, was an element of actual safety; for in all human probability, had the viaduct *not* been there, and had the erratic wheels been left to go their way unchecked, until they had slewed so far out of line that when the check-chains came to a bearing all possibility of restraining the wheels would have been gone, a serious catastrophe would have resulted. Is it necessary that they should be so attached? If so, a reason does not yet appear. Certainly not a half nor a quarter of the usual slack is needed for passing curves, and the argument that, however little slack be

left, there will still be enough to permit the truck speedily to run off the ties if it uses up all the slack there is, is founded on a false assumption as to the usual course of events, and the work which would be thrown upon them, which would not be continuous, but jerky and instantaneous.

Another noticeable feature of this accident is that, as is so frequently the case, the engine and tender passed in safety, but the first truck of the first car was derailed. It is possible that this is, in all such cases, due more or less to the fact that the engine causes the disturbance which derails the car behind it, but a more reasonable explanation is that the peculiar character of the locomotive wheel-base, and the propinquity of the wheels, has much to do with this very frequent and rather extraordinary immunity. A very frequent result of an opposite character to the rear truck of the train, happened in this case also; that, whereas all the others kept along safely with their cars, the last truck had a much worse fate and was dragged from under the car-body, although this was probably, under the circumstances, the best thing which could have happened to it. The difference is beyond doubt due to the absence of the restraining effect of the coupling, and this must be kept in view in all consideration of the effect of check-chains with little slack.

Chicago Through Shipments Eastward for Seven Years.

Chicago through rail shipments eastward by the complete report, including freight of all classes (but not live stock and dressed beef), in the month of December, have been, for seven years, in tons:

Year.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
Tons.	179,154	244,790	259,326	240,151	202,689	283,400	279,840

Thus the shipments for the month in 1885 were less than in any other year of the seven except 1879 and 1883. In this connection it should be said that prior to 1883 the shipments of certain junction points, which in the aggregate for the year 1882 are said to have shipped about 9 per cent. of the Chicago shipments, were not included, so that the shipments from the points now included were somewhat greater than the figures given for the first four years.

The decrease from 1884, when the shipments were largest, was 15½ per cent.; but the shipments were, nevertheless, greater than was indicated by the incomplete weekly reports of flour, grain and provision shipments. These gave these shipments as 168,604 tons in 1885, against 218,629 in 1884, a decrease of 50,025 tons, or 30 per cent., while we find the actual decrease in all through freight to have been but 43,560 tons, or 15½ per cent. The complete report shows for last month 71,236 tons more than the incomplete report, an average of more than 16,000 tons per week. In 1884 the excess of the complete over the incomplete report was about 14,600 tons per week. These figures are worth bearing in mind when reading the weekly reports telegraphed from Chicago. The freight not included in these reports not only is very considerable in amount, but it does not fluctuate to anything like the extent of the flour and grain shipments, and moreover, it includes all the best-paying freight. In some weeks of light shipments the unreported higher class freight doubtless yields more profit than all the flour, grain and provisions reported. They also very greatly modify the percentages carried by the different railroads, so that those reported weekly are often very different from the percentages of earnings divided.

The total Chicago through rail shipments eastward were decidedly larger last year than ever before. They have been for seven years, in tons:

Year.	Tons.	Year.	Tons.
1879.....	2,471,738	1883.....	2,401,488
1880.....	2,309,610	1884.....	2,825,364
1881.....	2,889,317	1885.....	3,187,180
1882.....	2,129,989		

The increase in 1885 over 1884 was 12½ per cent., and over 1881, heretofore the year of largest shipments, was 10½ per cent.

Of course the large shipments of last year were due to the low rates, extending through all but the two last months of the season of lake navigation, and taking from the lake vessels their usual business. The course of rates down to July was very much the same, only a trifle worse, as in 1884, but the attempt to restore rates failed, and in September and for some time in October the rates were lower than ever. Just as soon as rates were restored even to the very low basis of 20 cents, shipments fell off. In July and August, when there was some attempt to maintain them at 20 cents, they were very small; in the winter and spring, on the contrary, they were large without precedent. For the first and the last half of the year they have been:

Year.	1st half.	2d half.	Year.	1st half.	2d half.
1879.....	1,489,142	982,596	1883.....	1,209,078	1,192,410
1880.....	1,197,307	1,112,353	1884.....	1,611,525	1,223,839
1881.....	1,382,087	1,507,230	1885.....	1,830,973	1,356,219
1882.....	1,140,080	1,027,869			

The seasons of railroad wars are shown here by the

* "Check Chains that do not Check," *Railroad Gazette*, March 14, 1884. "Useful and Useless Check Chains," Feb. 27, 1885.

large shipments. The rates were extremely low in the first half of 1879, 1884 and 1885, and in the last half of 1881. When rates were maintained throughout the year, the shipments have not differed much in the two halves. The very low rates last September made the shipments then 133,959 tons more than in 1884, and this is just about equal to the increase in the last half of last year over 1884. The marketing of the large crops of 1884 would have tended to make the shipments of the first half of last year larger than the average, but those of the last half, owing to the light wheat crop, were likely to be less than the average; and if rates had been maintained, probably the shipments would not have been very much more than in 1882. Something like one-fifth of the shipments of the year were due to carrying at cost or less, and was diverted from lake vessels. Of traffic that can be had at paying rates there is at Chicago now, apparently, little more than in 1880, though since the beginning of that year the number of lines from Chicago to the East has increased from five to eight, and tens of thousands of miles have been added to the mileage of railroads west of Chicago, all supposed to carry produce to it for shipment to the East.

In the last three months of the year the Chicago shipments have been:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
541,404	644,098	734,506	647,317	642,682	757,360	700,194

For some ten days at the beginning of this quarter this year a great deal of freight was carried at the lowest September rates, but for the rest of the time rates have been quite well maintained at 20 and 25 cents for grain to New York. Rates were also tolerably maintained in 1884, and still better and higher rates in the other years except 1881. The result is, shipments in 1885 about 8 per cent. more than in 1880, 1882 and 1883, and 7½ per cent. less than in 1884. It was only in October, however, that the shipments were larger than in 1884; since then they have been somewhat less than in any other year since 1879 except 1883, while rates have been lower than in any other year except 1884 and 1881. At current rates the profits on the December shipments may be estimated as \$800,000, divided among all the lines which carry it to the seaboard. In 1880, when the shipments were not very different in amount, the profits on them were probably as much as \$1,300,000. The difference between a 40 and a 25-cent rate makes an immense difference in profits. The reduced profits, moreover, have to be divided among more roads. There is now, however, a larger proportion of high-class freight, which prevents a reduction of profits in proportion to the reduction in the basing rate.

The reduction of profits for the whole year has been probably quite as great. The shipments in the three spring months and in September were made at rates which probably barely covered the cost of carrying, and very nearly half the shipments of the year were made in these months. Moreover, in all the rest of the year the margin of profit was very narrow. There can be no doubt that the aggregate profits from the business were not half as great last year as in 1880, and as new roads at the Chicago end have taken about one-fourth of the business, this means that the older roads lost seriously. These have made not more than three-eighths of their 1880 profits from this business. It is now very much less important to any road than it used to be.

Grain Exports.

The Bureau of Statistics has reported the quantities and value of grain and flour exported from the United States in December and the last year, and the occasion invites comparison with previous years. Two crops have an effect on the exports of small grains for the calendar year, the exports for the first half of the year being exclusively from the crop of the previous year, so that we may not judge of the present course of exports from the movement of the whole of last year, but, much more safely, from the movement in the last half of it. The wheat crop of 1884 was 513 million bushels, and that of 1885 but 357 millions, and it is the last one which is governing the exports now. Therefore, it is important to give the exports of the last half of the year separately, which we have done in the table below, where the quantity gives grain of all kinds and flour reduced to bushels:

Breadstuff Exports for Six Years.			
Bushels:	December.	Six mos. to Dec. 31.	Year.
1880.....	17,224,029	164,227,847	393,419,124
1881.....	12,581,924	107,322,795	227,243,843
1882.....	15,405,855	102,970,997	160,249,323
1883.....	12,555,020	90,368,292	175,317,229
1884.....	18,169,083	88,747,463	164,767,180
1885.....	13,991,990	98,006,475	168,309,867
Value:			
1880.....	\$18,626,243	\$153,580,174	\$275,936,859
1881.....	13,800,128	112,137,643	224,118,560
1882.....	17,087,790	117,822,556	182,078,865
1883.....	12,941,693	87,543,245	172,692,180
1884.....	14,361,542	79,700,307	147,813,403
1885.....	10,117,242	92,068,732	129,757,260

For the entire year 1885 the exports were slightly

greater in quantity than in 1884, but the value of them was 20 per cent. less, chiefly because wheat, the dearer grain, formed the bulk of the exports in 1884 (121 millions out of the 165), while in 1885 it made a much smaller proportion (96 millions out of 168); the decrease in value not being great—averaging for both wheat and flour 95 cents in 1885, against just \$1.00 in 1884. The reduction in the value of corn was much greater—from 59.4 to 52 cents, or 12½ per cent. The year's exports were equal in quantity to the average of the last four years, but very far below that average in value, and \$53,000,000 (29 per cent.) less than in 1882, when the quantity exported was smallest. Compared with 1880 and 1881, the decreases are immense—42½ per cent. in quantity and 53 per cent. in value since 1880.

The last half year makes an even more unfavorable comparison; there was a slight gain in quantity for the whole year, but for the last half of it there has been a decrease of 20½ million bushels (23 per cent.) in quantity; and while the decrease was \$18,056,000 in value, for the whole year, for the last half it was \$26,700,000, or more than one-third. If we come to December, when the marketing of new corn from our second large crop might have permitted large exports of that grain, we find the decline just about as serious as for the whole half-year—23 per cent. in quantity and nearly 30 per cent. in value.

This is a very discouraging condition of things. Evidently business is getting no stimulus from our grain exports; and while it is doubtless true that these exports are less important to the country than they were a few years ago, owing to the great growth in population and non-agricultural industries, yet we should feel much more confident of good business in 1886 if the grain exports in the last half year had realized \$153,000,000, as in the last half of 1880, instead of \$53,000,000, which was their actual value.

The Baltimore & Ohio continues to sell tickets from New York to the Western cities for \$5 less than the standard rate, and the other railroads continue to charge full rates and make no outward sign of uneasiness. The Pennsylvania meets its rates at Washington and Baltimore, and the diversion, whatever it may be, is suffered by the pool lines in common, though the traffic is probably diverted chiefly from the lines which have "differential rates." As usual, when passenger rates are affected, the matter attracts much more attention from the public than when there is a greater reduction in freight rates which yield many times as great an income. Mr. Fink, in an interview with a *Herald* reporter, copied elsewhere, has given some facts concerning the amount of the business affected which are very interesting and heretofore inaccessible. He says that the total income from passengers from New York to the cities to which rates are reduced is but \$800,000 per year. This is an excellent reason for not meeting the cut, and for suffering whatever diversion of traffic may occur rather than demoralize rates on the other \$8,000,000 worth of through passenger business which the trunk lines have. Statements differ as to the number of passengers the Baltimore & Ohio is getting in New York. It reports a number of tickets sold largely in excess of the number of passengers which the Pennsylvania people report to have carried to Baltimore for it; possibly it sells tickets not closely limited, and the scalpers have been laying in a supply. It is, however, sure to get a large share of the business with so large a difference as \$5, especially to Cincinnati, to which it has a short route. It is hard to make a really large business at this season, however, and to Cincinnati it is never very large. All the time the Baltimore & Ohio is getting much talked about, which suits it exactly.

We have had so far reports of December earnings from 63 railroads, with the following aggregate:

	1885.	1884.	Increase.	P. c.
Earnings.....	\$20,275,184	\$19,393,622	\$881,562	4.5

More than half this gain was by 19 roads which reported two weeks ago, while 21 reporting last week gained nearly all the rest, the 23 which report this week for the first time having in the aggregate a trifling decrease.

The more important changes not heretofore remarked are the large gains of 34 per cent. by the Hoosac Tunnel & Western, 39½ by the Indiana, Bloomington & Western, 14 by the Buffalo, New York & Pennsylvania, 13 by the West Michigan, 13½ by the Illinois lines of the Illinois Central, 13 by the Main Line and 14 by the Belleville Line of the St. Louis & Terre Haute, 26½ by the Texas & St. Louis and 17½ by the Vicksburg & Meridian, and the large losses of 16 per cent. by the Manitoba, 22 by the Alabama Great South-

ern, 28 by the Denver & Rio Grande Western, and 16½ by the Fort Scott & Gulf. The larger number of Southern roads have a decrease, but there are some curious exceptions. Thus while there is a decrease of 2.3 per cent. on the Southern Division of the Illinois Central, of 4.2 per cent. on the parallel Mobile & Ohio, and of 7.3 per cent. on the parallel Louisville & Nashville, there is an increase of 9.3 per cent. on the parallel Cincinnati, New Orleans & Texas Pacific, a decrease of no less than 22 per cent. on its extension, the Alabama Great Southern, and of 15½ on its further extension, the New Orleans & Northwestern, and an increase of 17½ on the Vicksburg & Meridian, another line of the same system crossing most of the above at right angles.

Though the average increase in earnings so far shown was less in December than in November, still the December earnings were perhaps the more satisfactory, because December was not so unfavorable a month as November in 1884. A large increase was required to make the earnings tolerable in November; a smaller one suffices in December.

A great deal has been said about the competition of India, etc., driving our wheat out of the European markets. There has been little or no increase in the production of Indian corn outside of this country, and in fact we have the market for that pretty much to ourselves, yet our corn exports also are very much less than they were a few years ago. For three years previous to last year there was good reason for this, because we had light crops, the decrease in them being much greater than our exports ever were; but the crop of 1884 was larger than ever before, and yet the exports were smaller than in any year from 1876 to 1881, inclusive. The corn exports have been, in millions of bushels:

Year.	Million bu.	Year.	Million bu.	Year.	Million bu.
1872.....	45.0	1877.....	72.6	1882.....	15.4
1873.....	30.6	1878.....	83.4	1883.....	61.3
1874.....	32.3	1879.....	84.7	1884.....	32.6
1875.....	29.0	1880.....	117.4	1885.....	63.3
1876.....	67.3	1881.....	72.8		

Now, the corn production in 1875 (from which the exports of 1876 were made) was 1,320 millions; of 1884, 1,795 millions; with 475 millions more corn we exported 4 millions less. The crop of 1,755 millions supplied 117 millions for export; from 40 millions more in 1884 54 millions less were exported.

The chief explanation doubtless is that we want the corn ourselves—that the home consumption has increased. Moreover, only a very small proportion of the crop is exported in any event—even in 1880 less than 7 per cent. No great expansion of consumption is necessary to absorb that. The crop just gathered is reported to be 141 millions more than that of 1884, and as it is the second large crop, we ought to be able to spare something like that quantity. The December exports, too, indicate that we may considerably increase our exports from that crop, as, though less than in 1879, they were larger than in any other year in December, in which month they have been, for ten years, in millions of bushels:

1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
3.3	5.5	4.6	7.1	4.0	2.2	2.3	2.7	4.8	6.1

The exports in each of the last six months have been:

July.	Aug.	Sept.	Oct.	Nov.	Dec.
4.0	3.0	3.9	4.4	2.8	6.1

Usually much the larger part of the exports is made in the first half of the year, but the movement has not usually been large until spring.

The last report of the New York Railroad Commission, selections from which we published last week, is not a document likely to command much attention or respect. The Commission has done some very good work, but it has a faculty for giving very bad reasons for its most commendable decisions, and the facts concerning the railroad business of the state are not skillfully presented.

The report of the Massachusetts Commission, which was issued nearly at the same time, gives a very interesting account of the main facts in the railroad business of the state, for a series of years, presented in the usual form, which is intelligible to every one. There is not a large amount in it of wide general interest, as there used to be in Mr. Adams' time, when that gentleman vigorously discussed general problems, before any one else seemed to have thought seriously of them; for which there is much less occasion now, when the country is full of amateur professors of railroad politics, though it is to be confessed they are mostly quacks, and not nearly so capable of learning by experience as Mr. Adams showed himself.

We again give up a large amount of space to the presentation of practical results with steam excavators, not only that the comparative practical results of one machine and another may be seen, but as giv-

ing instructive and cumulative evidence of what can be done with any one of the better class of excavators.

It is clear from the various records we have published that, under favorable circumstances, track may be raised 6 in. with steam-shovel and unloading plow, at a cost of from \$55 to \$125 per mile, or 4½ to 10 cents per cubic yard, for the material delivered on track; the work of putting the material under being, to a large extent, at least, merely a substitute for other work on lining and surfacing which must be done anyway, and hence not fairly chargeable in full to ballasting. The work of organizing large special gangs, with all its attendant annoyances and losses, is with these appliances not necessary, and the additional loss arising from a longer haul than is possible for the minimum costs above may, by a more rational system of handling ballast trains, be reduced very much below what is customary, by methods discussed at some length in our issue of Dec. 25. On the Canada Southern Railway the table in another column shows that 125 miles of track was actually raised about 6 in. (1,120 cubic yards per mile) at a cost of 4.55 cents per mile, 150,052 cubic yards being put out by one steam shovel in less than eight months. This is a record which can rarely be equaled or even very closely approached, for all the conditions were, if not as favorable as they might be, more favorable than they often will be, but the excess need in no case be very great where suitable material, at reasonable intervals, exists.

When it is considered how great an influence such a lift as 6 in. has on the smooth running of trains and on the durability of track and rolling-stock, in what other way can an equal expenditure accomplish so great results? On tens of thousands of miles in this country which persistently neglect proper ballasting, there is no other way. It is in literal truth the stitch in time which saves nine, but that weakness of human nature which leads men in this, as in so many other instances, to put off everything which can be put off, as long as possible, and to be over-ready to believe that they are compelled to do so, causes this stitch in time to be neglected year after year in hundreds of instances, without any real necessity or excuse, and in even more instances prevents the work from being more than half done, for no road ballasted with gravel can be considered to be as well ballasted as economy demands (unless on a naturally sandy and porous sub-soil) with less than 18 in. of ballast between top of tie and top of road-bed, and few roads indeed have that depth. It is clear from the figures presented that by using good steam shovels and ballast plows, and by giving the ballast trains, when the haul is of any length, some rights which the regular trains and the dispatcher are bound to respect, such a depth can be had for from one-half to one-third the ordinary cost, and no manager or superintendent who is willing to look a year or two before his nose can, in any ordinary case, do anything which will ultimately redound so much to the advantage of the property and to the credit of his management.

Heavy Locomotives and Bridges.

The locomotive which we illustrate and describe on another page is an interesting example of immense weight and great power concentrated on a very short wheel-base, and though built for a gauge several inches narrower than the standard, this immense machine is exceeded in weight by very few engines running. The concentration within the driving-wheel base, 13 ft. 8 in. long, of a weight of 116,000 lbs. throws a strain on rails or bridges which is considerably in excess of the usual maximum loads assumed for wheel-bases of that length, the latter being now, as a usual maximum, 24,000 lbs. per axle, or 96,000 lbs. on a wheel-base usually a foot or more longer than that described. There is, to be sure, usually a stipulation that heavier loads, running as high as 80,000 lbs. on two axles 7 ft. apart, shall likewise be allowed for, which prevents all danger of over-strain from the very heaviest engines of the freight types in the parts most immediately strained from the load, and the low unit strains now stipulated for the most carefully designed work prevent all immediate danger from the overweight of such engines as that we describe. But the general fact that it is getting to be no unfrequent occurrence for engines heavier than are stipulated for in any bridge specifications to be turned out for regular service is a significant one, deserving of more attention than it seems to get. This increase in weight and power is, no doubt, in the direction of economy up to the point where the rails can sustain it, and rails are now being produced so cheaply, and there is so much use for old rails for extensions of both side tracks and main tracks that any necessary increase in weight of rails will not, and probably ought not to, impede the use of as heavy locomotives as may seem in themselves economical. But the bridges are a more permanent and more serious matter, and whether the railroads are not laying up for themselves a stock of future trouble and expense by permitting bridges to be put in which are barely adequate to sustain the maximums of present practice merely to save the small sum which it would cost to make them 10 per cent. heavier

may well be questioned. Not only the total load per wheel-base, but the total load per axle are now in regular practice of some roads larger than any bridge specifications allow for.

British Rail Exports.

The exports of rails from Great Britain to the United States were 302 tons last December, and for the year they have been:

	1879.	1880.	1881.	1882.	1883.	1884.	1885.
Iron.....	20,820	106,061	96,139	21,135	2,035	7	....
Steel.....	23,750	113,214	194,001	173,876	69,343	17,476	5,538

Total 44,570 219,275 290,140 195,011 71,378 17,483 5,538

Thus last year they were not one-third of the 1884 exports, not one-twelfth of those of 1883, and not one-fiftieth of those of 1881. The totals for three years before 1879 were 256, 31 and 9 tons respectively.

The British exports to countries other than the United States kept up pretty well until 1884, and then fell off largely. For six years they have been:

	1880.	1881.	1882.	1883.	1884.	1885.
318,815	425,992	587,776	707,036	524,267	491,803	....

These have fluctuated much less than the exports to this country, yet were smaller last year than in any other since 1881, and 30 per cent. less than in 1883. The total British rail exports have been:

	1880.	1881.	1882.	1883.	1884.	1885.
538,690	716,132	781,783	778,414	541,750	497,341	....

In 1880 and 1881 we took more than 40 per cent. of the total British exports; in 1882, 25 per cent.; last year, only 1½ per cent.

The exports from Great Britain to South and Central America, Canada, Australia and India still measure pretty nearly the total consumption of those countries, and so give some clue to the activity of railroad construction in them. The takings of those countries to which considerable quantities have been sent, have been for six years:

	1881.	1882.	1883.	1884.	1885.
Australasia.....	88,006	81,021	137,083	111,366	69,638
East India.....	46,009	88,342	129,932	91,090	174,008
Argentine Republic.....	44,183	79,680	77,757	33,436	....
British N. America.....	104,737	89,985	75,027	57,206	65,094
Brazil.....	54,152	45,897	33,830	34,093	17,018
Sweden and Norway.....	12,358	9,985	24,065	25,441	18,888
United States.....	290,140	195,007	71,378	17,483	5,538
Italy.....	25,004	71,132	59,065	9,224	6,567
South Africa.....	....	32,382	34,522	9,613	10,737
Mexico.....	....	40,361	32,147	2,654	615
Unspecified countries.....	96,649	52,497	74,307	52,411	48,444

* Included in "Unspecified countries" in 1881.

Thus there was a decrease last year, compared with 1884 in the exports to almost every country except Canada and India, and a very large increase in the exports to India, due largely, no doubt, to the construction of the military railroad to Afghanistan, though there is other construction in progress, and quite a system of old roads to maintain, the last of which ought to require as much as 50,000 tons yearly. There were also 21,755 tons sent to Egypt—nearly all for a military road which was not built, and India and Egypt together took about 40 per cent. of the total British exports. Mexico has almost ceased to import rails, and the South American countries have greatly reduced their takings.

Great Britain no longer finds any important customers for rails in continental Europe. All those the exports to which are reported (Russia, Sweden and Norway, Germany, Holland, Spain and Italy), together took 41,809 tons last year, which is not enough for 400 miles of average European track.

Chicago through shipments eastward for the week ending Jan. 16, including only flour, grain and provisions for the last two years, and freight of all classes previously, have been, in tons:

	1880.	1881.	1882.	1883.	1884.	1885.	1886.
31,171	59,587	70,724	96,034	65,559	67,053	23,482	....

Thus the shipments were this year less than in any other of the seven and a little more than a third of those of last year; allowing for the high-class freights, they were probably something more than half the shipments in the corresponding weeks of 1882, 1883 and 1884.

For six successive weeks the total shipments and the percentage of them taken by each railroad have been:

Tons:	Week ending.					
	Dec. 12.	Dec. 19.	Dec. 26.	Jan. 2.	Jan. 9.	Jan. 16.
Flour.....	5,274	5,139	7,024	4,485	3,206	3,864
Grain.....	21,342	21,239	18,831	19,440	17,056	12,713
Provisions.....	11,509	10,522	11,715	10,278	8,913	8,965
Total.....	40,215	36,930	37,573	34,213	29,175	23,482
Per cent.:						
C. & Grand T. ..	12.3	9.0	10.6	11.8	7.7	7.2
Mich. Cen.	19.0	21.0	13.5	11.0	13.4	12.0
Lake Shore	13.9	15.1	20.8	14.7	16.5	14.7
Nickel Plate	9.8	10.5	10.0	10.4	8.7	6.4
St. Wayne	13.9	16.9	16.0	16.4	16.2	23.7
St. L. & P.	12.4	11.5	13.2	13.8	11.8	16.4
Balt. & Ohio.....	9.8	7.0	7.9	8.9	13.5	12.0
Ch. & Atlantic ..	6.9	9.0	9.4	13.0	12.2	7.6
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

The shipments were made very small last week by the blockade of the Western roads during the previous week, and reduced slightly, probably, by obstructions on some of the Eastern lines. The whole decrease from the previous week was in grain, which at this season is arriving chiefly by the lines that were blockaded, by those extending west and southwest from Chicago, not by those extending north-west. However favorable the weather, the shipments doubtless would have been light for a winter week. In no previous winter week since the shipments have been reported have the Chicago shipments been so small, though there often have been terrible blockades of the eastern roads themselves. In 1881, when traffic was obstructed probably more than in any other winter, the shipments fell below 50,000 tons in only

one week of January and February, though in the first week of March they fell to 28,085 tons. In the whole of last year there were but three weeks, and those in midsummer, when the shipments were as small as last week. The falling off in grain and flour compared with last year was to be expected, but the decrease in provision shipments has also been considerable, and an increase rather than a decrease in these was to be expected. The total shipments for the last five weeks this year and last were:

	Flour.	Grain.	Provisions.	Total.
1885-86.....	23,908	87,312	50,303	161,523
1884-85.....	52,118	135,894	60,472	248,484
Decrease.....	28,450	48,582	10,079	87,111
Per cent.....	54.8	35.8	16.7	35.0

Thus about eight-ninths of the whole decrease was in grain and flour. That there should be a light movement of wheat is easy to understand when we see that the price is but 11 cents a bushel more in New York than Chicago, while the charge for transportation is 15 cents, and actually the wheat movement to the sea-board is almost at a standstill. The freight on corn is also greater than the difference in price, but the movement of that is largely to interior points, though to the sea-board it is very large, in spite of these conditions, which might be expected to prohibit it.

The shipments of corn from all the reporting western markets and the receipts of the Atlantic ports since November have been:

	1885-86.	1884-85.	Increase.	P. c.
N. W. shipments.....	8,309,591	7,948,922	360,669	4.5
Atlantic receipts ..	12,495,977	8,833,725	3,662,252	41.2

Considering the very large consumption of corn in the interior of the East (where farmers buy Western corn to feed their stock), it is evident that a very large amount this winter has come from markets or places which do not report their shipments. The southern two-thirds of Illinois and most of Indiana and Ohio are likely to ship from such places, besides which some shipments from places further west escape these markets. This helps to explain why the railroads have been pretty busy in spite of the very small Chicago shipments, but it makes us wonder the more why so much corn has been sent to the seaboard when the difference between the price there and at the Western market will not pay the freight.

The percentages last week are notable for the great gains by the two Pennsylvania roads, which together carried 40.1 per cent. of the whole, against less than 31 per cent. in any of the five weeks previous. The Baltimore & Ohio also carried more than usual; but as the total carried by the eight roads was not more than a single one of them has carried in some weeks, and the blockade of their western connections does not affect them all alike, these percentages are not important. There have been rumors of cutting rates, but the shipments would almost certainly have been larger if there had been anything of the kind.

The effect of the snow blockades in the West week before last is seen in the reduction of receipts of grain at the Northwestern markets from 5,081,700 bushels in the week to Jan. 2 to 2,802,300 in the week to Jan. 9. The effect on the shipments from these markets was naturally much less (the eastern roads not having been blockaded), they falling from 2,930,000 to 2,081,000. It is noticeable that St. Louis suffered as much proportionally as Chicago, and that there was scarcely any decrease at Milwaukee. The blockade, in fact, extended further south than usual, and not as far north, Minnesota and Dakota being nearly free from it.

Further evidence of the effect of the storm is that last week the total grain receipts at Chicago were but 923,000 bushels, against 1,310,000 in the previous week and 2,777,000 in the week to Jan. 2, before the storm, and more than 2,000,000 bushels in nearly every December week.

Still more emphatic evidence is given by the reduced earnings of the Chicago & Northwestern, and, to a less extent (because less of its road was affected) of the Milwaukee & St. Paul. The Northwestern earned \$275,250 in the second week of this month, against \$294,600 in the first week and \$381,650 in the second week of 1885. The St. Paul's earnings fell from \$326,000 in the first week to \$313,000 in the second week and \$361,652 in the corresponding week of 1885. Curious evidence of the extent of the storm to the south is the decrease of St. Louis & San Francisco earnings from \$82,100 in 1885 to \$54,900 this year. In Kansas, railroads were blocked by snow south of the latitude of Richmond, Va. The Northwestern roads also had light earnings in the first week of this month, the average earnings per week having been \$446,890 in December against \$284,925 in the first two weeks of January for the Northwestern, and \$527,290 in December against \$319,500 in January for the St. Paul. Not but that their earnings are always less in January than in December, but that the decreases of 36 per cent. for the Northwestern and 40 per cent. for the St. Paul are larger than when traffic has free course both months. The Northwestern's January earnings were less than its December earnings 12 per cent. in 1882, 25 in 1883, 14½ in 1884, and 22½ in 1885, against 36 per cent. so far this year. The St. Paul has had meanwhile a decrease in January from the previous December of 22½ in 1882, 31 in 1883, 31½ in 1884, and 31½ last year, against 40 per cent. so far this year. Of course such declines of earnings have little significance. The years are few in which there are not some blockades, and they do not greatly diminish the year's total traffic, though there are cases when, if long continued, as in 1881, they may be the cause of one road's losing traffic to another; the greatest injury they do to railroads is by increasing their expenses. Many railroads were seriously affected in this way in 1881, when obstructions were serious on many lines in January, February, and, most of all, in March, while some new lines

were not dug out of the snow until May, and the wreckage of rolling stock was fearful. Some roads earning 8 per cent. dividends for the year did not earn their fixed charges in the first three months of it, and a few scarcely earned their expenses. There has been nothing like that so far this winter, and we can have two or three more blockades like that already suffered and yet not be worse off than in the average winter, probably.

It should be noted, however, that last year January was a good month for earnings for many railroads in the West and South, and that a decrease this year will not be so important as a decrease in December, and especially November last.

The packing season is not keeping up the gain indicated in November—so far from it that for the two months of November and December the number packed at the principal points is no greater than last year, while in November the gain was 40 per cent. For the two months there is a decrease of 6 per cent. at Chicago, 15 per cent. at Indianapolis, 28 per cent. at Louisville, and 9 per cent. at Cincinnati, and an increase of 36 per cent. at Kansas City, 62½ per cent. at Nebraska City, and 15 per cent. at Milwaukee.

Kansas City not only takes second place, as it did last year, also, but its packing has been 29½ per cent. of the Chicago packing, against 20 per cent. last year. St. Louis, which had packed 59,425 less than Kansas City last year, packed 164,251 less this year.

The exports of pork products, which in every previous month had been larger in 1885 than in 1884, in December were smaller than in 1884, and smaller than in any other December since 1877, having been for nine years, in millions of pounds:

1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884. 1885.
99.8 131.9 113.4 154.5 104.0 90.1 87.4 96.0 80.2

The exports for the year, however, were much larger in 1885 than in 1884, and for nine years have been in millions of pounds:

1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884. 1885.
788.8 1,138.0 1,176.9 1,335.1 1,030.1 961.0 788.7 635.2 795.8

Thus last year the exports were the largest for four years, and 25 per cent. more than in 1884. They were, however, much less than in any of the four years from 1878 to 1881, and 40 per cent. less than in 1880, when they were largest.

The quantities of beef products exported in December were slightly less in 1885 than in 1884, and of dairy products much less, and the decrease in values greater. The values of the exports of beef and pork and dairy products in December and for the calendar year have been:

1881. 1882. 1883. 1884. 1885.
Dec. \$12,987,325 \$12,071,422 \$10,844,952 \$11,233,701 \$8,474,880
Year. 133,332,417 96,934,423 114,228,956 96,449,142 93,713,020

Thus for December and the year the exports were less in 1885 than in any other of the five, though for the year only a little less than in 1884 and 1882. But compared with 1881, there is a decrease of nearly 30 per cent., and compared with 1883 a decrease of 18 per cent. A large part of the decline is due to lower prices. While there was an increase of 25 per cent. in the quantity of pork products exported from 1884 to 1885, the increase in their value was but 2½ per cent., the average value per pound having fallen from 9.46 to 7.74 cents per pound.

The Department of Agriculture reports but little decrease in the area sown to winter wheat last fall, the most important being 13 per cent. in Illinois, 7 in Kansas, 5 in Missouri and 19 per cent. in Oregon. The latter it is not easy to understand, for Oregon grows no other crop on a large scale for market, and will hardly find use all at once for one-fifth of its last year's wheat area, while it had less cause for discouragement than any other state, except Michigan, because it had an extraordinarily heavy yield last year. California is shown to have a decrease of only 1 per cent., while an increase of 1 per cent. is reported in Ohio and Michigan and 3 per cent. in Indiana. These comparisons are with the area sown in 1884. The area harvested was about 10 per cent. less. Thus this report indicates that there is now very much more winter wheat than was harvested last year.

The development of a great grazing country on the Northern Pacific Railroad has a tendency to increase the amount of cattle shipments to Chicago by such roads as the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul; and, in fact, they carry a somewhat larger proportion than formerly, though, as both share the shipments from the Union Pacific grazing territory, it is not possible to say how much the Northern Pacific has brought them. In 1885, compared with the previous year, the Northwestern gained 43,762 head (16 per cent.) and the St. Paul 18,403 (9 per cent.), while the Chicago, Burlington & Quincy, which gets no part of the Northern Pacific cattle, gained 22,382 head (5 per cent.). The Chicago & Alton, however, which has to go south of the Union Pacific for range cattle, made nearly the same gain as the Northwestern, namely, 42,075 head (16½ per cent.), and compared with 1881, which was before the St. Paul had access to the range cattle, its progress has been more remarkable than that of any other road, the Chicago receipts by it having increased from 161,076 in 1881 to 299,998 last year (86 per cent.). The Burlington, which has extended its lines directly across the range cattle country since 1880, has little more than kept up its receipts since 1881, though it still is far ahead of any other road. The Northwestern has now entered the grazing territory with a line of its own, and will probably gain by it. These are the only Chicago roads that show considerable changes in cattle receipts since 1880, the Illinois Central and the Rock Island carrying no more now than in 1881, though the total receipts have increased 80 per cent., meanwhile. The per-

centage of the total receipts brought by each Western railroad in 1881 and 1885 was:

	C. B. & Q.	N. W. C. & A.	R. I. M. & St. P.	W.	I. C.
1881	32.7	15.9	10.7	15.8	6.0
1885	25.6	16.0	15.3	11.5	9.8

The Wabash was not open for the whole year until 1881 and the Milwaukee & St. Paul had not completed its Omaha line then, so that there were special reasons for their increase. Aside from these the Northwestern and the Chicago & Alton have advanced in position. The numbers brought by each road in these two years were:

	1885.	1881.	Inc. or Dec.	P. c.
C. M. & St. P.	220,247	88,395	131,852	146.1
C. & N. W.	312,935	238,429	74,506	31.3
C. B. & Q.	502,863	480,703	22,160	2.7
C. R. I. & P.	225,147	230,752	5,605	4.9
C. & A.	289,588	161,076	128,512	86.3
Wabash	191,942	130,899	61,043	46.6
Ill. Cent.	93,230	91,435	1,795	2.0
Total	1,964,018	1,498,550	465,468	31.0

The Wabash carried a sixth less last year than the year before, and the St. Paul an eighth less than in 1883, and the road which now seems to be in the best position to gain is the Northwestern, though it must share with the Milwaukee & St. Paul the increase from the Northern Pacific region. It is the production between that and the Union Pacific that it is now in better condition to command.

The value of the Union Pacific land grant is illustrated by the fact that though the sales in 1885 were not half as great as in 1884, they still amounted to \$4,137,013—a very comfortable sum, even for a corporation like the Union Pacific. The sales for the last two years have been 6,298,914 acres, against 4,612,016 in the entire previous history of the company (including the Kansas Pacific and the Denver Pacific). The immense sales in 1884 were doubtless nearly all grazing lands, the average price being but \$1.78 per acre. Last year, apparently, a larger proportion of agricultural land was sold, or else grazing land bears a better price, for the average was \$2.80 per acre. The total sales up to this time have been 10,310,000 acres for \$33,380,000. There remain in the company's possession about 7,400,000 acres, doubtless the poorest of the whole, including a very large amount of arid lands in the mountains and elsewhere, but also including a very large amount of grazing land which is now bringing a considerable price, and likely to produce several more million of dollars.

The Southwestern Railway Association, composed of the lines carrying traffic between the "Missouri River points" (Kansas City, Leavenworth, Atchison and St. Joseph) and Chicago, St. Louis, and roads to the East intermediate, has probably the most important business of any of the numerous Chicago associations. The earnings in 1885 from the business covered by it are reported to have been \$10,622,937, which was \$1,636,152, or 13½ per cent., less than in 1884—certainly a very large decrease, not indicated by the reports of the earnings of that member of the Association which has the largest share of the business, the Chicago, Burlington & Quincy. The very large crops in Kansas in 1884 should have made the east-bound shipments large in the first half of last year, but the very bad wheat crop last year must have reduced them in the last half. In fact, the earnings from east-bound traffic fell off nearly one-third, from \$6,624,993 to \$4,457,694—an astounding reduction—while at the same time the earnings on west-bound traffic increased 7 per cent., which also is surprising in view of the decrease in the other direction. In 1884 only 36½ per cent. of the earnings were from west-bound business; in 1885, 47½ per cent. The traffic in the two directions is much more nearly equal west of Chicago than east of it, but it is surprising to see the earnings in the two directions so nearly equal as they were last year, especially as lumber is not included, being pooled separately (when pooled at all), and fought for frequently. The earnings from lumber are given as \$1,427,536 in 1885, which is 13½ per cent. more than in 1884 (when for some time lumber was carried to Kansas City for 5 cents per 100 lbs.), and equal to 35 per cent. of the other west-bound earnings. It is a much larger proportion of the traffic, as it is carried for a lower rate than anything else except salt.

Reports are published of the earnings from pooled business in the Pacific Coast Association and the Colorado and Utah Association, by which it appears the latter produced the larger earnings, the amounts being \$68,601 by the Pacific Coast traffic and \$79,490 in the Colorado and Utah traffic. The lines between Chicago and the Missouri River are those included in both cases.

It also appears that the west-bound business is about as much greater than the east-bound as the east-bound is larger than the west-bound east of Chicago and Buffalo. The earnings from the traffic in each direction were:

	Pacific Coast.	East.	Colorado and Utah.	East.
West.	\$49,630	\$18,971	\$57,808	\$21,592

The east-bound Pacific Coast earnings were 28 per cent. of the total, the east-bound Colorado Utah earnings also 28 per cent. of the whole. The Northwestern carried the largest Pacific Coast business, followed closely by the Rock Island, while the Milwaukee & St. Paul stood third, with the Chicago & Alton fourth, and the Burlington fifth, with but 14½ per cent. of the whole.

In the Colorado and Utah Associations, on the other hand the Burlington carried much more than any other road and earned 36 per cent. of the total pool earnings, while the Rock Island had 26 per cent. and no other road more than 11½ per cent.

The movement of cotton this crop-year has not been in proportion to the increase in the crops (about 13½ per cent.),

The total amount marketed in the four months of the crop year is reported by the *Commercial and Financial Chronicle* to have been in bales:

	1882.	1883.	1884.	1885.
	4,421,055	4,358,352	4,474,253	4,778,437

The weight of bales was 1.7 per cent. greater in 1885 than in 1884, but allowing for this, the increase in the quantity marketed is but 8½ per cent.

The movement "overland," directly by rail or river to North Atlantic points or Northern mills, has increased much faster than the total movement to market, having been, in bales:

	1883.	1884.	1885.
	542,065	513,897	698,792

—36 per cent. more in 1885 than in 1884.

The shipments by the different routes have changed greatly in the three years, there being great gains in those from St. Louis, those over the Illinois Central and the Evansville & Terre Haute Railroad, and great decreases in those over the Cairo & Vincennes, as follows:

	1885.	1884.	1883.
From St. Louis	256,047	168,247	149,515
Over Miss., above St. Louis	15,568	13,882	59,119
Via Cairo:			
Over Illinois Central	121,733	89,879	34,763
" Cairo & Vincennes	37,759	95,763	106,130
	159,192	182,642	140,893
Via Louisville:			
Over Jeff., Mad. & Ind	22,673	26,775	16,402
" Ohio & Miss.	9,536	14,481	20,779
" St. Louis, Cin. & Lex.	38,311	23,895	35,988
	70,520	65,151	73,160
Via Cincinnati:			
By Ohio River	37,147	485	12,685
" Cin. Southern	57,580	55,328	47,569
	94,727	55,813	60,254
Over Evansville & Terre Haute	31,214	19,336	10,853

The increase of 50 per cent. at St. Louis and above is doubtless due to the much greater crops in Texas and Arkansas, and it should be benefiting greatly the railroads southwest of St. Louis, the chief of which do not report earnings. In the aggregate, there is no great change at Cairo, the very great decrease of the Cairo & Vincennes going far towards balancing the very great increase of the Illinois Central. So at Louisville, the aggregate shipments are not greatly changed, though the shipments by some of the roads have varied greatly. At Cincinnati, however, the receipts were very much greater in 1885 than before, the gain by river being greater than that by the Cincinnati Southern, and the whole being last year 34½ per cent. more than at Louisville, while in 1884 Louisville shipped nearly twice as much as Cincinnati.

The figures indicate that at the beginning of this year there remained to be marketed by the planters about 1,700,000 bales, against 1,225,000 last year. This should have a favorable effect on the earnings of many of the Southern railroads, which are not doing as well as was expected.

While the Chicago, Burlington & Quincy had an increase of 3½ per cent. in total gross earnings last November, it gained no less than 9½ per cent. in passenger earnings and 23½ per cent. in miscellaneous earnings, the freight earnings increasing less than 1 per cent. There were only two other months—May and September—when there was any increase in passenger earnings, but the freight earnings have increased largely in several months. The gain in freight earnings was \$240,887 in October and only \$14,282 in November.

For November the earnings from several sources have been for three years:

	1883.	1884.	1885.
Passengers	\$417,923	\$406,845	\$444,872
Freight	2,040,421	1,691,803	1,708,185
Other	164,420	135,244	167,096
Total	\$2,562,774	\$2,233,891	\$2,318,052

The decrease in freight earnings since 1883 is thus no less than 16½ per cent., while there has been a gain of 6½ per cent. in passenger and 60 per cent. in miscellaneous earnings, the two together making up for about one-fourth of the decrease in freight earnings. For the 11 months ending with November the earnings have been:

	1883.	1884.	1885.
Passenger	\$4,947,208	\$4,977,297	\$4,860,830
Freight	17,966,775	17,000,354	17,872,145
Other	1,125,467	1,445,662	1,493,476
Total	\$24,039,450	\$23,423,314	\$24,226,451

Thus the passenger earnings remain somewhat less than in 1884 or 1883; the freight earnings also are less than in 1883; but such has been the increase in the usually neglected miscellaneous earnings in the two years (32½ per cent., amounting to \$368,009) that the total earnings were larger last year than in 1883.

The favorable turn in passenger earnings indicates that

The New York, West Shore & Buffalo report to the Railroad Commissioners for the year ending with September last shows that the working expenses were 180 per cent. of the gross earnings, excluding taxes from expenses. Its gross earnings were at the rate of \$7,406 per mile, which equals those of some of the most profitable Western railroads. The Michigan Central in 1884 earned \$7,747, the Lake Shore \$11,075, the Chicago, Burlington & Quincy \$6,337, the Chicago & Northwestern \$6,727, the Illinois Central (in Illinois) \$6,462, the Chicago, Milwaukee & St. Paul, \$4,910. At the extremely low rates it was forced to accept the West Shore must have carried a great deal of traffic to earn so much. The New York Central at the same time earned \$25,529 per mile, nearly 3½ times as much as the West Shore, though nearly the whole of the West Shore is main line, and not much more than half the New York Central. The number

of passenger journeys on the West Shore was 1,881,506; on the New York Central 12,747,801, or nearly seven times as many, and per mile of road it was 13,376 on the Central, against 4,020 on the West Shore. Nearly as great is the contrast between the tons of freight carried on the two roads, the Central handling 10,802,957 and the West Shore 1,825,176. Evidently the West Shore can have made very little impression on the enormous local traffic between Albany and Buffalo.

Including interest on the funded debt, the West Shore's deficit for the year was \$6,228,630, which is a great price to pay for the privilege of working a railroad.

In the last quarter of the fiscal year to Sept. 30, the West Shore's gross earnings were 15 per cent. less in 1885 than in 1884, and the working expenses very nearly the same.

The tonnage of vessels built on the Clyde of late has fallen off like American railroad construction, having been for ten years:

Years.	Tonnage.	Years.	Tonnage.
1885.....	183,458	1880.....	241,114
1884.....	206,854	1879.....	174,750
1883.....	419,664	1878.....	222,353
1882.....	391,934	1877.....	169,710
1881.....	341,022	1876.....	174,824

Thus the tonnage last year was the smallest since 1879, was 35 per cent. less than in 1884, and 54 per cent. less than in 1883, when it was largest. Last year 48 per cent., end in 1884 45 per cent., of the new vessels were of steel; in 1879 only 10½ per cent. and even in 1882 only 27½ per cent.

The annual report of the Massachusetts Railroad Commissioners states that the number of each of the five approved couplers adopted by the various railroads of the state is as follows: Janney, 4; Hilliard, 24; Cowell, 78; Ames, 204 United States, 840. Though asked to approve of several other devices, they consider that the ideal of safety will be best reached by the universal adoption of one coupler. Two applications for the approval of additional couplers have been made during the year. The Railroad Commissioners require that they should have borne the test of actual traffic, and have already secured the approval of the directors of a Massachusetts railroad willing to use them. Replies to any inquiry show that no accident, fatal or otherwise, has arisen from the use of the automatic couplers approved. The report suggests that Congress should compel the use of safety couplers in inter-state traffic.

On the Boston & Albany 40 per cent. of the whole number of employés killed and injured were hurt in coupling or uncoupling cars. On the Fitchburg, no less than 50 per cent. were so injured, while on the Boston & Maine and Boston & Providence, the proportions were 22 and 16 per cent. respectively.

Mr. George R. Blanchard has accepted the invitation of the railroads east of Chicago to become the Commissioner of their Association, which it is hoped will expand so as to take in many other western connections of the trunk lines. A meeting of western companies will be held next week, by which time Mr. Blanchard is to be at his post.

The University of Tokio, Tokio, Japan, through Mr. H. Kato, President, requests us to state that they are desirous of receiving and filing for reference by students, professors and others, all forms of trade catalogues and other publications bearing upon engineering works. The sending of matter of such kind for such purpose is so obviously casting bread upon the waters, which is very likely to return to the senders after many days, if not sooner, that probably nothing more is needed than to call attention to the request to insure compliance therewith.

A very curious argument, if the reports given in the Washington dispatches are correct, was advanced by one of the opponents of the Baltimore & Ohio's proposed bridge over the Arthur Kill in the hearing before the Senate Committee on Commerce this week. This argument was that, as the existing lines to New York had been obliged to provide terminal accommodations at an enormous cost, it would be exceedingly unfair and unjust for Congress to give the Baltimore & Ohio access to Staten Island, where it could secure terminal property at a comparatively low cost. The committee did not seem to see the force of this argument, but if it should be admitted it would logically follow that existing companies might claim that they were entitled to the passage of a law forbidding the construction of any new road whose cost per mile should be less than that of their own line, as in that case the new road would certainly have an unfair advantage in any competition. In strict justice this should be supplemented by an act forbidding any road to adopt any improvement in construction or management which might cheapen the cost of operation, unless the other lines should adopt a like improvement at the same time. In fact, a strictly logical carrying out of the argument would lead us into restrictions too numerous to mention, and, as a matter of policy, to say nothing of principle, it is to be hoped that the Committee on Commerce will not attach too much importance to this argument in coming to its decision.

How a rumor may spring up from a very small cause is illustrated by a dispatch published in the Boston papers on Tuesday of this week, to the effect that the Central Vermont Company had leased the Boston & Lowell road. Now this, if true, was very important news, and it caused a great deal of comment, especially as no one had known of negotiations for any such lease. But a day later it appeared that the dispatch had really read that the Central Vermont had leased the "B. & L." road, and that in this case "B. & L." stood, not for the 650 miles of the Boston & Lowell, as the Boston

recipients of the dispatch not unnaturally assumed, but for the 34 miles of the Burlington & Lamoille, an unimportant local road. And so the rumor collapsed and disappeared.

The announcement made by telegraph at the meeting of the American Society of Civil Engineers on Wednesday, that the Canada Pacific had definitely adopted the 24 o'clock system, and was having all time-tables, watches and clocks altered in accordance therewith, is worthy of more than passing notice as the first positive beginning of a reform which has much in its favor and little against it, for railroad use at least, and which may possibly make rapid progress, as the managers of 60,000 miles of road have heretofore explicitly declared in favor of it. It was also reported that the Northern Pacific was favorably considering early action of the same kind, as well as some of the neighboring roads. On very long lines of that class the system offers particular advantages, and it is natural they should act first; but it is a more serious change to bring about than the system of standard time, so happily and speedily adopted.

In Belgium, Dec. 30, the bids for supplying metal ties for experimental test on the State Railroad, were opened. For 2,625 tons (of 2,204 lbs.) of the "Post" pattern, weighing 165 lbs. each, the lowest bid was \$23.37, equal to \$23.75 per ton of 2,240 lbs. At this price the ties cost about \$1.75 each. The bids were for iron, not steel. For 525 tons of the Bernard pattern, the lowest for iron was \$29 and for steel, \$38.30. Belgian ironmakers complain that the weight prescribed is so great that it is not possible to compete with wood. Complaint is also made that at a recent letting of contracts for fish-plates only steel was permitted. The ironmakers think they should have been given a chance, and that the iron offered at \$22.16 per ton would have been cheaper than the steel accepted at \$28.80.

In connection with the statistics on terminal facilities which we have recently (Jan. 8, 1886) published, a further illustration of the vast growth which they attain at points of any considerable business activity may be found in the statistics of Boston terminal facilities given in our issue of May 15, 1885. The statistics were gathered by the Boston Herald and are imperfect and sketchy in form, giving the mileage of side-track for only one of the eight roads entering the city, but that the most important one, the Boston & Albany. The acreage is given, however, for each road, and aggregates, including 14½ acres owned by the Hocs Tunnel Dock & Elevator Co., 568 acres, of which the Boston & Albany owns 124½, or about 22 per cent., on which it has 36 miles of side track, or one mile to about 3.4 acres of land, which is equivalent to covering the entire area with tracks 28 ft. apart. Assuming that there is one mile of side track for each four acres of land owned by other roads (which, as it is, much of it, still unimproved, is probably a considerably excessive estimate), there would be 146 miles of track in Boston, and the yards of Buffalo, New York and Boston would compare as follows:

	Acres land.	Miles track.
Buffalo.....	3,600	436
New York.....	383	200
Boston.....	658	146

Even neglecting the probability that the mileage for Boston is considerably less than this rough estimate, this extraordinary accumulation of track at Buffalo is well brought out by this comparison. Again, compare the 36 miles of side track (in itself a very large amount) which answers the purposes of the Boston & Albany for its exchange and other business at its terminal yards in Boston, with the 139 miles which the New York Central has at Buffalo, and the 116 miles which the Erie has, as shown in our issue of Jan. 8.

The rude "law" laid down in our discussion of the Buffalo yard, in the same issue, that the beginning of trunk-line traffic proper is marked by the point where the total mileage of side-track equals the total mileage of main line is in a measure supported by the statistics of the eight "Boston roads," all of which are short, and all of which, for their short length, very pretty close on what may be called a trunk-line traffic. Their aggregate of main line is 814 miles, or 102 miles each. Their aggregate of sidings is 765 miles, or 96 miles each. They compare as follows:

More sidings than main line.		Less siding than main line.	
M. L. Sidings.		M. L. Sidings.	
Boston & Albany.....	202 221	Boston & Maine.....	115 84
Boston & Lowell.....	27 50	N. Y. & New Eng.....	215 115
Eastern.....	41 60		
Fitchburg.....	50 65		
Boston & Prov.....	44 48		
Old Colony.....	120 121		

There is some obscurity as to what is fairly main line and what not, but the comparison is exact enough for the present purpose.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1886 is given in the current number of the Railroad Gazette as follows:

Gulf, Colorado & Santa Fe.—Extended from Brownwood, Tex., northwest 5 miles.

Sheffield & Birmingham.—Extended southward to Russellville, Ala., 2 miles.

This is a total of 7 miles on 2 lines, making in all 15 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

Miles.			Miles			Miles		
1886.....	15	1881.....	47	1876.....	24			
1885.....	12	1880.....	62	1875.....	33			
1884.....	27	1879.....		1874.....	32			
1883.....	37	1878.....		1873.....	28			
1882.....	39	1877.....		1872.....	22			

These figures include main track only, second tracks and sidings not being counted.

The weather has been very unfavorable for tracklaying, and not much new road is likely to be reported for several weeks to come.

NEW PUBLICATIONS.

The Journal of the German Railroad Union (*Zeitung des Vereins deutscher Eisenbahn-Verwaltungen*) with its last number for 1885, finishes its twenty-fifth volume, and publishes the prospectus which appeared in its first number in 1860. This newspaper is not, as might be supposed, merely the organ of the Union, but a general railroad newspaper of the highest class, and for information concerning traffic and methods of administration is unrivalled. It gives little attention to the purely engineering side of railroads, another journal, the *Organ for Railroad Progress*, extensively devoted to this, being published under the auspices of the Union, and being admirable of its kind. The *Organ* is a bi-monthly, beautifully illustrated with lithographic plates, while the *Journal* is a semi-weekly with a page like that of *The Nation* (9 x 12 in.), varying in number from week to week, there being in 1884 1,288 in all, or an average of 12½ each. The *Journal* not only gives very completely the news of the German and Austrian railroads, but also, more fully than any other one newspaper, the news of the other railroads of continental Europe, including countries which it is not easy to find information about elsewhere—as Russia, Roumania, Switzerland, Italy and Turkey. We can heartily recommend it to those who wish to keep informed about European railroads. In all these twenty-five years it has had one editor, Dr. Wm. Koch, who must be the patriarch of railroad journalists, though Mr. Edmund Heusinger von Waldegg, the editor of the technical *Organ*, and author or editor of a great number of railroad books, is also a veteran, having established the *Organ* before it was adopted by the Union.

Annual Meeting of the American Society of Civil Engineers.

The annual meeting of the American Society of Civil Engineers was held at the house of the society, Jan. 20 and 21, a large number being present, owing in great degree to the interest excited by a contested election. The opposition ticket for officers, headed by Henry Flad, of St. Louis, was elected.

The report of the board of direction showed a net increase of 44 members and 12 juniors, with slight decreases in the other grades, making the total connected with the society 928, instead of 878, a net increase of 50, against 83 last year. Twelve deaths, 3 transfers and 5 resignations occurred during the year; 56 new members, 2 associates and 15 juniors qualified.

The report of the Treasurer gave the following receipts and expenditures, adding those for 1884 for comparison:

	1885.	1884.
Receipts:		
Entrance fees.....	\$1,920.00	\$2,730.00
Dues.....	10,935.37	12,311.62
Miscellaneous.....	7,420.65	10,925.00
Total.....	\$20,276.02	\$25,966.62
Expenditures:		
Publications.....	\$5,632.41	\$4,521.24
Library.....	1,344.27	595.46
House expenses.....	1,472.64	1,500.01
Convention and annual meeting.....	1,016.74	844.41
Other expenses.....	8,128.54	7,178.63
Total.....	\$17,594.60	\$14,639.75

The invested funds of the Society are \$34,183, an increase of about \$300.

The Norman medal was awarded to Mr. Eliot C. Clarke, for his paper on "Record of Tests of Cement on the Boston Main Drainage Works," and the Rowland prize to Mr. A. M. Wellington, for his paper on "Experiments with New Apparatus on Journal Friction at Low Velocities."

Invitations to hold the ensuing annual convention at Denver, Col., and Burlington, Vt., were read. A previous ballot showed a large majority in favor of Denver, which, after considerable discussion, was unanimously selected, with amendment authorizing the board of direction to select Colorado Springs, or other point near Denver, and to fix the date and other details. The question of a proposed excursion to England was laid on the table for one year, 78 having answered favorably in respect to attending.

The Committee on a Joint Library with the Mechanical and Mining Engineers' Societies, reported that the joint committee had organized and were in complete accord, with hopeful prospect of reaching a satisfactory conclusion.

The Committee on Uniform Standard Time made an interesting report in respect to the progress of the 24 o'clock system and uniform standard time. They reported that 171 railroads, operating 60,000 miles, were ready to join the movement to abandon all use of "a. m." and "p. m.," and some urged no delay. The Canadian Pacific had determined to take the initiative, and a telegram received during the meeting announced that it had already gone into operation. Time-tables were printed, all watches and clocks on the road were being changed, and the Northern Pacific and other northwestern roads had the same steps under serious consideration.

Two other technical committees reported progress and were continued. The Committee on Organization of the society, appointed to consider the question of bringing about some form of organic union with the many existing local engineering societies, by some system of sections, reported informally through the Chairman that, as to the general question of the expediency of such action, the committee were entirely unanimous, but as to the details of a plan for that end they had not been able to agree. A minority report had been prepared, signed by three of the seven members, but was not received on the constitutional point that the committee itself must report to permit a minority report, and the committee was continued.

The ballot showed that Henry Flad had 321 votes for President, against 148 for Washington A. Roebling, the remainder of the opposition ticket, as announced in our issue of Jan. 8, being elected by about similar majorities. After lunch at the Society house the afternoon was devoted to an interesting paper by Prof. Thos. Egleston, on microscopic examinations of the Egyptian obelisk, showing its disintegration to be due to a fungoid growth, and to a description by Mr. R. P. Rothwell of the Hall plan of submarine tunneling (described in our columns heretofore), of which he spoke very highly. Messrs. H. Stanley Goodwin, A. M. Wellington, Geo. S. Morison, Samuel Rea and Thomas Rodd were announced as

the Committee on the form of rails and wheels. At the evening meeting Mr. B. S. Church, Chief Engineer of the Water Works Commission, explained the various works in progress and proposed for supplying New York with water. On Thursday an excursion was had over these works occupying most of the day, and in the evening a reception for gentlemen was held in the Society house, which was largely attended and broke up at a late hour.

Arbitration of a Question of Competing Passenger Fares.

A case recently arose between the Ohio & Mississippi Railway and the Central Passenger Committee, in which, by agreement, S. F. Pierson, Henry Monett and John N. Abbott were chosen Arbitrators. The case and the decision have a general interest.

The case was thus stated for the consideration of the Arbitrators by the two parties:

"You are requested to decide upon the following points, and to state the theory and principles upon which your decision is based:

"1st. Is the present method of making rates for San Francisco excursion business, under the rules of the Central Passenger Committee, a discrimination against the Ohio & Mississippi Railway and the territory tributary to Cincinnati, in favor of the Chicago and Missouri River lines and the territory tributary to Chicago?

"2d. If you find that such a discrimination does exist, what rate should be made from Cincinnati and what method should be adopted in order to cure this discrimination?"

DECISION.

Having reference to the first question submitted, the Arbitrators find that the Missouri River, between Kansas City and Omaha, constitutes a rate meridian from which rates are common to Pacific Coast points; that the lines east of the Missouri River to Chicago, a distance of 488 miles, adopt a less excursion rate than that provided for similar business by the rules of the Central Passenger Committee east of St. Louis; and that, therefore, the rate between Missouri River by way of St. Louis lines and Eastern points is higher than for similar distances by Chicago lines.

The Arbitrators therefore agree that there is a discrimination against the Ohio & Mississippi Railway and the territory tributary to Cincinnati in favor of the Chicago lines and the territory tributary to Chicago.

In order, therefore, to cure this discrimination they decide that the rate between Cincinnati and the Missouri River, for California excursions ought to be \$19.20. This rate is computed by taking \$13.15, the Chicago rate, from the nearest Missouri River basing point to a point equidistant with Chicago on the short line toward Cincinnati, and adding for the remaining distance a sum computed by the rule of the Central Passenger Committee covering excursion rates. Thus, the distance from Kansas City to Cincinnati via Indianapolis is agreed by the parties to be 607 miles, and from the Missouri River to Chicago 488 miles. Taking the Chicago rate of \$13.15 for 488 miles of the Cincinnati line leaves the distance between Cincinnati and Indianapolis and nine miles west thereof, to be computed under the rule of the Central Passenger Committee. We find the rate between Cincinnati and Indianapolis to be \$3.50 and compute the remaining nine miles at 27 cents—total \$3.77. Eighty per cent. of double this amount gives \$6.03, which added to \$13.15 makes \$19.18, the exact figure, which we have increased to the nearest multiple of five and made it \$19.20.

As regards the line of the Ohio & Mississippi Railway, we decide that rates may, in the discretion of that company, be made to the Missouri River basing points at same rate per mile as is made by the lines between Chicago and the Missouri River for similar distances. In the case of a line south of Chicago and near to and parallel with the Chicago lines to Missouri River, it is plain that, throughout its entire length, it would be competitive with the Chicago lines for Missouri River business, and would be entitled to make the same rates for the same distances to that common base. This in turn would affect another line lying south of it in the same way, so that a line in the extreme southern portion of the state of Illinois would have, so far as the natural equities are concerned, a right to make the same rate per mile as the Chicago line for similar business and for the same distance east of the Missouri River base.

If the Ohio & Mississippi Railway Co. elects to adopt this basis, we do not know anything in railroad usage or public policy to prevent.

The theory or principle upon which we base our decision is, that lines in the Central Passenger Committee with their western connections to Missouri River ought to be placed upon a parity with the Chicago and Missouri River lines in the matter of passenger rates for through business, and your Arbitrators believe that all the equities will be substantially preserved if a common rate meridian is established between Chicago and the Ohio River, all the points of which shall be equidistant by direct lines from the Missouri River rate meridian. With the establishment of such a line of basing points, the rule of the Central Passenger Committee would apply to the nearest basing point, from all intermediate stations and all points east thereof, with substantial justice to all. The injustice of any other plan is less noticeable for classes of business covered by full sets of through tickets, upon which of course common rates are made between common points; but in the case referred to, where arbitrary rates and local tickets are used to a basing point for want of full ticket facilities, the discrimination becomes strikingly evident.

Your Arbitrators in coming to this decision have not established any new doctrine. The adoption of the Missouri River as a common line for basing rates for the entire Pacific Coast is a striking case in point. This meridian of common rates shuts off all discussion as to the proper rate to be adopted west of it. If another line is established 488 miles east of this, and between the Missouri River meridian and the Chicago meridian common through rates prevail, the work of rate-making is greatly simplified, equities are preserved, as between competing lines in the district thus bounded, and the traveling public, who certainly appear to have some interest in the matter, will be afforded similar rates for similar service under similar conditions in common territory, thus removing cause for their just complaint of discrimination.

The same principle is observed in trunk-line territory, as regards Canadaigua, Elmira, Williamsport, and Harrisburg, in the matter of west-bound rates, and there are other cases more or less definitely based upon the notion of rate meridians. Holding this theory to be a correct one, your Arbitrators find in the case submitted, that the claim of Mr. Shattuck for the Ohio & Mississippi Railway Co. and the territory tributary to Cincinnati is substantially sustained, and that the difficulty on the part of the defendant (the Central Passenger Committee) is not on account of any fault in the 80 per cent. rule, but in the lack of appropriate basing points up to which the rule may equitably apply.

(Signed)

S. F. PIERSON,
HENRY MONETT,
JOHN N. ABBOTT, } Arbitrators.

TECHNICAL.

Locomotive Building.

The Brooks Locomotive Works in Dunkirk, N. Y., have taken an order for 3 locomotives for the new Chautauqua Lake road, to be delivered early in the spring.

The Roanoke Machine Works in Roanoke, Va., are building 14 new locomotives, in addition to the large contracts for cars which they recently received.

The Car Shops.

The foundry of the Beaver Falls Car Works at Beaver Falls, Pa., caught fire early on the morning of Jan. 15, and the fire consumed the entire building, including the pattern room and a large quantity of patterns, with all the machinery. The loss is estimated at \$80,000. The buildings were owned by the Economite Society, and were leased by the car works.

The Wason Car & Foundry Co. in Chattanooga, Tenn., has recently received orders for 25 cars for the Dayton Coal & Iron Co., and 10 for the Daisy Coke Co., and has several other small orders.

Bridge Notes.

The Keystone Bridge Co., in Pittsburgh, has taken a contract for 13 spans of iron bridge, varying from 150 to 225 ft. in length, for the East Tennessee, Virginia & Georgia road.

Cofrode & Saylor, of the Philadelphia Bridge Works at Pottstown, Pa., have taken a contract to build a draw-bridge 250 ft. span for the Pennsylvania Railroad at the arsenal in Philadelphia.

Iron and Steel.

The North Chicago Rolling Mill Co. in adjusting wages at its North Chicago mills for this year adopted a sliding scale system under which wages depend on the prices of steel and iron, this plan having been in use at the South Chicago mills for a year past. The immediate effect is an advance of from 10 to 12 per cent. in all wages.

The Bethlehem Iron Co. in Bethlehem, Pa., are shipping 20 carloads of steel rails daily over the Lehigh Valley road to Perth Amboy, whence they go eastward by water.

The Nashua Iron & Steel Co. in Nashua, N. H., has just completed a steamboat shaft which weighed 10 tons as it came from the hammer.

Star Furnace in the Hanging Rock region in Ohio was to go into blast this week.

Mr. R. H. Lewis, lately of the Lake Erie Iron Co. at Cleveland has succeeded Mr. D. H. Bradley as Vice President and General Manager of the Calumet Iron & Steel Co. at Cummings, near Chicago.

The National Tube Works Co. will shortly erect in its works at McKeesport, Pa., three new mills for the manufacture of 18, 20 and 24 in. pipe, larger size than have heretofore been made at this mill.

Manufacturing and Business.

Mr. Henry Roberts, of Hartford, Conn., manufacturer of woven wire car seats, will in the spring commence the building of a new factory, to accommodate the large increase in his business. Mr. Roberts has recently filled orders for his seats from the Maine Central, the Boston & Maine, the Boston & Providence, the New York, Providence & Boston, the Delaware, Lackawanna & Western, the Scioto Valley, the Chicago & Northwestern and other roads.

The Rail Market.

Steel Rails.—The market is quiet and firm, with quotations steady at \$34@35 per ton at eastern mills. There is still a good deal of inquiry, and several large orders are expected.

Rail Fastenings.—An increasing demand is reported, with quotations steady at 2.25 cents per lb. for spikes in Pittsburgh: 2.75@2.90c. for trackbolts and 1.70@1.80c. for splicebars.

Old Rails.—Quotations for old iron rails are entirely nominal at \$22@23 per ton at tidewater. Buyers are holding off, claiming that they cannot afford to pay present prices, and no sales are reported. Old steel rails are quoted at \$22@23 per ton at Pittsburgh, with increasing demand.

Demand for Lumber for Cars.

The *Northwestern Lumberman* of Jan. 16 says: "The feature of trade now interesting the dealers is the lively inquiry for car stuff, and the apparent scarcity of it. In the matter of Norway car-sills there seems to be fairly lively doings. Buyers are picking up all they can find, and at greatly advanced prices. Stuff that sold a short time ago at \$14.50 a thousand has lately changed hands at \$19, and it is insisted that good Norway car-sills are worth \$20 a thousand. This up-jump in prices has resulted in increased demand consequent on the revival of car-building. Nearly every factory now has orders to fill, and more in prospect. The demand has come so suddenly that the Michigan mills were unprepared for it, and are now not equal to the emergency. Buyers are resorting to the wholesale yards here for what they cannot procure at the mills. What is characteristic of the demand for car-sills is also in a measure peculiar to car-siding and decking just now. There is a brisk inquiry all over the district for both soft and Norway pine strips for car-building. A and B flooring in white pine are the grades mostly used in car construction. The stuff required is, however, short lumber 5 and 8 ft. long, mostly the former. The stock has already been so nearly bought up that cutting of longer lengths will have to be resorted to, which will tend to still further stiffen prices, which are already on the advance. It is claimed that short stuff is now worth \$2 a thousand more than it was before the new demand sprung up."

Blast Furnaces of the United States.

The *Iron Age* says: "We give on the next page our usual monthly report of the condition of the blast furnaces of the country. This is also what has heretofore been our quarterly report. But two furnaces are missing, both charcoal, one each in Utah and Oregon. The one in Utah is out of blast and of little or no importance, and the Oregon furnace does not affect the result, so that the report may be regarded as complete."

"In a condensed form the table makes the following showing as to the condition of the furnaces Jan. 1, 1886:

Fuel.	In blast.		Out of blast.	
	No.	Weekly capacity.	No.	Weekly capacity.
Charcoal.....	57	7,804	160	18,673
Anthracite.....	104	29,811	117	25,518
Bituminous.....	114	54,190	106	40,508
Total.....	275	91,814	383	82,704

"This shows a marked change since Dec. 1, when 254 furnaces were in blast, the increase being 21 furnaces, divided as follows: 4 less charcoal, 10 more anthracite and 15 more bituminous. The decrease in the capacity of the charcoal furnaces in blast is about 550 tons weekly, the increase in the capacity of the anthracite about 3,000, and of the bituminous some 4,400. As a rule, the furnaces now blowing in are not of as large capacity as some of those that have been in blast. The increase in anthracite furnaces has been in

New York and the Lehigh and Schuylkill valleys in Pennsylvania; in bituminous stacks, chiefly in the Shenandoah and Mahoning valleys and the Hanging Rock region. Other furnaces are preparing to blow in, and it is probable that February will find an increase, but not as marked as the past two months.

"Since Oct. 1, there has been a decided increase. At that time, 75 anthracite furnaces, with a capacity of 20,318 tons, were in blast. Jan. 1 it had increased to 104 furnaces, with 29,811 tons capacity. The bituminous furnaces had increased in the same time from 88, with a capacity of 43,234 tons, to 114, with a capacity of 54,190 tons.

The relative condition of the blast-furnace industry for the past seven years is shown in the following condensed table of furnaces in and out of blast on the first days of January, 1880-86.

	Furnaces in Blast, Jan. 1.						
	1880.	1881.	1882.	1883.	1884.	1885.	1886.
Charcoal.....	93	160	155	123	78	68	57
Anthracite.....	165	162	169	169	109	86	104
Bituminous.....	126	151	142	138	101	82	114
Total.....	384	473	466	430	288	236	275

	Furnaces out of Blast, Jan. 1.						
	1880.	1881.	1882.	1883.	1884.	1885.	1886.
Charcoal.....	146	112	117	128	169	159	169
Anthracite.....	67	76	67	64	122	135	117
Bituminous.....	80	68	78	88	125	141	106
Total.....	293	256	262	280	416	435	392

"This shows a material increase during the past year—18 anthracite furnaces and 32 bituminous. The year 1884 showed a reduction of 23 anthracite and 19 bituminous."

American Society of Civil Engineers.

At a meeting held in New York, Jan. 6, Vice-President Geo. S. Greene, Jr., occupied the chair. The ballot was canvassed upon the proposed amendment to the By-Laws, substituting in Section 24, Clause 5, the word "December" for the word "November." The clause will then read:

5th. "Any five members, not officers of the Society, may present to the board of directors, on or before Dec. 1, a list of names proposed by them for officers, which list or lists shall also be issued for ballot."

There were in the affirmative 142 votes, and in the negative 4 votes. This amendment was declared adopted.

The paper previously presented by Mr. Joseph M. Wilson, on Specifications for the Strength of Iron Bridges, was then discussed. Written discussions were presented from Messrs. William H. Burr, Mansfield Merriman, S. W. Robinson, George F. Swain, G. Bouscaren, Mace Moulton, A. P. Boller, George H. Pegram, William Sellers, James G. Dagnon, Geo. L. Vose, J. B. Davis and E. Thacher. The paper was also discussed by Mr. C. C. Schneider. It is intended to publish this paper, with the discussions, in an early number of the *Transactions*. An abstract of the paper and the extended discussions can hardly be given with justice to the writers.

Engineers' Club of Philadelphia.

The eighth annual meeting was held in Philadelphia, Jan. 9, President J. J. de Kinder in the chair; 45 members present.

The Secretary and Treasurer presented his annual report. The receipts were \$4,588, the expenditures \$4,101, and the cash balance \$609. The total assets, in addition to the value of the library and furniture, amount to \$1,498, and the total liabilities to about \$15, for which bills have not yet been rendered, leaving \$1,483 net. The membership now consists of 3 honorary, 5 corresponding, 423 active, and 8 associate. The net increase during the year has been 18 per cent. The residence of the active membership is distributed over about 25 states and five foreign countries; 226, or 53 per cent., reside within, and 197, or 46 per cent., without, the city of Philadelphia. The hand of death has been laid upon four of the best members: Theodore Bergner, Dwight Edward Pierce, David Hudson Shedaker and James Worrall.

The Secretary presented the resignations from active membership of Messrs. T. Everett Austin, W. Irving Babcock, James Beatty, Jr., C. John Hexamer, Andrew B. Leuffer, Thaddeus Norris, Arthur Winslow and L. M. Winston, which were accepted.

The Retiring President, Mr. Joseph J. de Kinder, read the Annual Address. The usual review of the Engineering of the past year is given. Special mention is made, with much interesting description in detail, of the following proposed or progressing works: the Panama, Manchester, enlargement of Suez, Corinth, Baltic and North Sea, new Chesapeake and Delaware, Hennepin, Paris and Dunkirk and Gulf of Siam and Indian Ocean canals—the reclamation of land in Russia and Missouri and Arkansas; the Baltimore and Ohio at Havre de Grace, Tay, Forth, St. Lawrence, Ohio at Henderson, Ky., and St. John steel cantilever bridges—the Croton and Washington aqueducts—the Mersey, British Channel, Prince Edward's Island and Chicago River tunnels—the Tehuantepec Ship Railway—railroads in China, Japan, Russia and America—the London & Southwestern railway station—Ship Building and Gunnery—the Flood Rock excavation—Natural, hydrogen and sawdust gases—the progress in electric lighting and power—and concluding with water supply, sewerage and general municipal engineering. He specially recommends that the latter be made a special question of study and discussion by the Club, and asks if it would not be profitable to ourselves and to the interest of the city if the Club would make the Engineering of Philadelphia and its public improvements a leading topic of the future.

The Tellers reported that the following had been elected officers for 1886: President, Washington Jones; Vice-President, Thomas M. Cleemann; Secretary and Treasurer, Howard Murphy. Directors, Frederick Graff, Rudolph Hering, William A. Ingham, Col. William Ludlow and Henry G. Morris.

They also reported the following elected Active Members: Albanus L. Smith, Samuel T. Williams, Robert E. Pettit and H. R. Cornelius.

Mr. Washington Jones took the chair for 1886 with appropriate remarks.

Glass Fish-plates.

The Rochester Tumbler Co., at Rochester, Pa., has just completed an order for 25,000 glass fish-plates, to be used on the Ninth Avenue Elevated road in New York. Experiments are to be made on that line with electric motors, and the glass fish-plates are used for the purpose of insulating the steel rails through which the current of electricity is carried.

New Processes of Making Iron and Steel.

Numerous important improvements in the metallurgy of iron and steel have been made during the past year.

A new dephosphorizing puddling process, the invention of Mr. Joseph Beasley, has been at work for over two years at Mr. John Raybold's works at Pensnett, Staffordshire, where more than 20,000 tons of bar iron of superior quality have been made entirely from phosphoric Northampton and cinder pig. The process consists in using a special fettling, composed of calcined tap cinder and blue billy reduced to the condition of sand and mixed with dilute hydrochloric acid. This mixture stands for three or four days, during which time it is frequently turned and incorporated, certain proportions of common salt and ground lime being added shortly before use. These ingredients are thoroughly commingled, made into a stiff paste with water, and plastered over the

ore or bulldog which is placed around the furnace bottom. Over this are thrown a few shovelfuls of a mixture composed of ground ore and ground hammer slag, saturated with hydrochloric acid prepared similarly to the first compound, and to which lime and salt are also added. With this fetting, and with a dose of oxide of iron administered toward the close of the puddling process, it appears that there is an increase of from 5 to 10 per cent. upon the weight of the pig charged into the furnace, and that the iron produced is free from red-shortness, shows a highly fibrous fracture equal to that of the best marked bars, and possesses a tensile strength of about 24 tons per square inch.

A new process of steel manufacture has been started by Messrs. Bott & Hackney at the Titanic Steel Works, Manchester. It is termed a direct process, and may be described as a compromise between the Bessemer and the crucible processes. An important advantage secured is that baked moulds are dispensed with, the castings being made entirely in green sand, so that the many severe internal strains caused by hard moulds at the time of cooling are avoided. Steel castings are thus produced which are practically free from blowholes and shrinkage, notwithstanding that metal out of one ladle can be indiscriminately poured into elevator bucket moulds less than $\frac{1}{4}$ inch thick, or into molds for heavy crank shafts.

The Clapp-Griffiths may be considered as a pneumatic system similar to the Bessemer, but with the difference that the converter is fixed and non-tilting, and that the blast is introduced around the lower section of the converter instead of through its bottom. The object of the process, like that of several others of a similar nature which have been introduced of late years, is to enable small users of steel to become their own manufacturers without having to lay down an expensive plant. The process has, it is said, been well proved by several firms, and is now coming largely into use. Dr. K. W. Hunt has published some analyses and results of tests, which convey the idea that there is at least in this process the germ of great future results in the direction of a nearly complete elimination of silicon, and the preparation of successful high phosphorus steel.

A new process of producing steel from wrought iron by means of plumbago has been invented by Mr. W. A. O. Wuth, of Pittsburgh, the steel produced being, it is stated, of a high grade and substantially free from sulphur and phosphorus, and containing a definite percentage of carbon. Mr. Wuth's process consists in making the steel from wrought iron that is practically free from phosphorus, sulphur and carbon, by melting it on an open hearth in contact with a form of carbon which will not oxidize at the heat necessary to smelt the iron, but which will unite with the iron at that heat. The decarburized iron is first cut into pieces and placed on the hearth of the furnace in layers piled one above the other. Between each layer of iron is spread a thin stratum of pulverized plumbago. The charge is melted in the usual way, and the operation further carried on as in the open-hearth process. Before the melted metal is withdrawn from the furnace, a small amount of spiegeleisen or ferromanganese is added. By this process it was stated that Mr. Wuth had made several charges of steel of 12 tons each, containing as low as 0.01 per cent. of phosphorus, and that he would be able to produce any kind of fine steel that might be desired. We have not, however, had any confirmation of the process having proved a practical commercial success.

A puddling furnace heated by natural gas has been invented by Mr. J. N. Pew, of Pittsburgh. The furnace is of the ordinary construction, provided at opposite ends with regenerators, filled with brick checker-work. Connected with the base of the regenerators is a flue, which leads to a central-reversing valve box. The upper end of the box is open for the admission of air, while the lower end communicates with the stack. In the sides of the regenerators are vertical flues, and in the bottom of each flue there is a perforated gas pipe. The upper ends of these flues communicate with the upper ends of the regenerators by means of lateral flues, which open into the regenerators at about right angles. The air, after having been highly heated, is mixed with the gas, and then passes over the bridge upon the bed of metal.—*Iron.*

American Locomotives for English Colonies.

An English exchange states: "Another order for locomotives for our colonies has been lost to the manufacturers of this country. The Queensland Railway have ordered five locomotive engines from the Baldwin Co., Philadelphia, U. S., at a total cost of \$9,250. It is, however, a consolation that another and larger order for 20 locomotives of class F has been entrusted to Messrs. Kitson & Co., of Leeds, Yorkshire, England, at a cost of \$2,000 each. These engines are to be similar to those of the same class already supplied by the same firm." The price of the Baldwin engines was therefore \$9,010 each, while the larger engines ordered in England cost \$9,740 each. The Queensland railroads are of the 3 ft. 6 in. gauge.

THE SCRAP HEAP.

A Singular Accident.

About noon on Jan. 13, as a freight train on the East Tennessee, Virginia & Georgia road was passing through a tunnel under Missionary Ridge near Chattanooga, Tenn., a locomotive which was loaded on a flat car struck the top of the tunnel, knocking three or four of the supporting timbers out of place. This caused a cave in the tunnel, breaking the train in two, a portion of it being on each side of the cave, and the car which was directly underneath was crushed. The accident made it necessary to transfer passengers, and blocked freight traffic for over 24 hours.

Getting Employes' Records.

The New York Central Co. has issued an order requiring all station agents, agents, baggagemen and all trainmen, both passenger and freight, to fill out a blank which gives for each man his age, the year in which he entered the employment of the company, the year in which he was promoted or appointed to his present position, and whether he is single or married. Station agents are required to fill out the blank for the men under them, and conductors for their trainmen. The object is to compile in a condensed form the record of each man in service on the road. It is further ordered that station agents and conductors shall notify the division superintendent promptly of any changes in their force, giving the reasons for such change and the names and records of the new appointments.

A Frozen Up Road.

A singular obstruction occurred last week on the Western North Carolina road. There are several tunnels on the road east of Asheville, in which there is a considerable flow of water. Ordinarily this water drips from the roof and is carried off by drains provided in the tunnel without causing any trouble, but the very severe and unprecedented cold weather last week caused heavy icicles to form in the tunnels, and several of them were entirely blocked with solid ice, forming an impenetrable barrier, which would have required blasting to remove it, and the company was obliged to wait

for a thaw before resuming the operation of the road. For nearly a week trains were either stopped entirely or very much delayed.

A Narrow Escape.

On the morning of Jan. 14 a train on the New York & Long Branch road was derailed by a broken frog near Matawan, N. J. The point where the derailment occurred was close to a trestle bridge over a deep ravine, and it was impossible to stop the train before reaching the bridge, as it was running at a high rate of speed. The engineer threw open the throttle, seeing that the only prospect of safety was to carry the train across, if possible. In this he succeeded, dragging the cars over on the ties, the wooden guard timbers preventing them from leaving the bridge. None of the cars were much damaged and none of the passengers were hurt, although all of them were pretty badly shaken up.

Accidents on Connecticut Railroads.

The report of the Connecticut Railroad Commissioners for the year ending Sept. 30 last says: "We are again able to report that no train accident attended with any serious injury to passengers has occurred during the year. It is true 12 passengers have been injured, 5 of them fatally, but all through their own want of care."

"Of persons not connected with the roads or their operation, usually classed as trespassers, an unusually large number have been injured, the total having been 119, of which 76 were fatally injured. Twenty-two were injured at highway crossings, of which number 13 died. Of employes, only 81 were reported injured, 17 of whom died. This is a reduction of 9 in the number fatally injured, and of 33 in the total number of employes injured, from the preceding year, and a reduction from two years ago of 49 per cent. in the injured, and of nearly 59 per cent. in the killed or fatally injured. The number of those reported as injured in coupling or uncoupling cars was 32, which was 27 per cent. less than the preceding year, and as the number injured in falling from the cars, which is the way in which, next to coupling and uncoupling, the greatest number are injured, was only two less than last year, there is some ground for thinking that the increase in safety couplers is beginning to have the hoped-for effect."

Railroad Young Men's Christian Association.

The Association at Minneapolis, Minn., reports for December a total attendance of 1,058 persons at the rooms. There are now 150 members, and the membership is continually increasing, the Association being in a prosperous condition. A course of lectures on "First Aid to the Injured" is announced to be given at the rooms of the Association on Wednesday evenings in February by the surgeons of the Minnesota Hospital College, who have volunteered their services. This course of lectures will be of peculiar service to railroad men, who are so often called upon to extend aid in cases of accidents.

Quarantine.

A woman went down to the Grand Trunk depot the other day to see about some freight expected from Canada, and after looking over his files the agent informed her that the goods had arrived in Windsor, but were being fumigated. "What business have they to open my boxes over there?" loudly demanded the woman. "Oh, they won't open the boxes at all; they will simply fumigate them." "Well, I won't pay for nothing of the sort, and I want you to understand it now!" "There will be no charge, madam; no charge." "And if they go and mark my bureau and bedsteads with paint or chalk, I'll have damages!" she said, as she pulled on her mittens. "They won't do it, ma'am. The law requires fumigation. It is simply fumigation." She went out shaking her head, and on the next block stopped the driver of an express wagon and asked: "Do you know what they fumigate goods for over in Windsor?" "Well, ma'am, I can't say for certain, but it has something to do with small-pox." "Yip!" she screamed, as she jumped a foot high. "They are going to fumigate the smallpox all through 'em to revenge on me for moving out of the country! Show me to the nearest police station!"—*Detroit Free Press.*

Burning the Old Cars.

If any one should take a trip along the line of the Pennsylvania Coal Co.'s abandoned gravity railroad just now, he would be greeted with immense bonfires at intervals along its route. The abandonment of the road left the company with 1,500 useless cars on its hands. (They are of 4 ft. 3 in. gauge.) In the construction of these cars many tons of iron were used. This being the only thing about the cars that could be utilized, the company resolved to remove it from them. As the best and quickest way to separate the iron from the woodwork, the cars have been piled in great heaps along the line and set on fire. These bonfires will consume a great many cords of excellent firewood that people in less favored communities would be glad to have. But the cars are burning in sight of mountains of anthracite, and the poor man can get fuel easier than he can bread.—*Port Jervis Gazette, Jan. 11.*

Hereditary Traits.

The engineer who many, many years ago went on a side-track to let the planet Venus pass, was probably the great grandfather of the Jerseymen who asks the editor of the *Evening Post*: "Will you please give your readers some information concerning what appears to be an electric light suspended very high in the air, seemingly a mile or two, which may be seen at night by those who look down Broadway toward the Battery? Where does it rise from? How is it suspended, and what is the object of it?"

The editor replies: "Our correspondent apparently refers to the evening star. The three questions which he asks about it we believe no astronomer has ever answered."

A Long Felt Want Supplied.

It has come at last. *Low water* has been patented, and hereafter any fireman or engineer allowing his boiler to get empty, infringes on U. S. Letters Patent, No. 329,446, dated Nov. 3, 1885, and, of course, renders himself liable to prosecution and a claim for heavy damages. The damage to the boiler, of course, takes care of itself.

A brilliant genius "out West" has actually patented a "new and useful improvement in Processes of Treating Steam-Boilers for Preventing Fractures and Explosions," which improvement (it) consists in firing up a steam boiler while it is empty, heating it white hot if necessary and allowing it to cool gradually. The claim put forth by the inventor is, that when boiler plates become crystallized, through long use, this annealing process will restore them to their original condition, or, if the plates of the boiler, when originally made, were crystallized, the boiler will be materially bettered by the treatment.

This is really a great advance in boiler engineering. Of course, no one wants to render himself liable to prosecution, so hereafter the fireman will keep a sharp lookout for his water-level, and see that it does not get so low that the patented process of "treating" the boiler will begin to operate. If this is done through carelessness, we hope the inventor will promptly be on hand with his claim for damages.

The inventor states that fuel containing sulphur should not

be used in carrying out the operations of this "process." He evidently intends to make so much money out of it before he dies, that it will not be necessary for him to continue in the business after his death.

He also states that the customary inclosing walls constitute a suitable furnace or box for the application of the necessary heat to the boiler. He neglects to inform us whether his patent covers the setting of boilers up in brick-work or not; we presume it does.

He also informs us that his application is based upon a long series of tests with "actual steam boilers," both single ones and in batteries. He says at least 100 boilers have been subjected under his personal superintendence, to his patented treatment. If this is so, he must have been an awfully careless fireman. We should dislike very much to have him fire a boiler for us.—*The Locomotive.*

A Singular Accident.

Engineer Bryant of the Eastern Division is confined to his house on Jersey avenue by injuries received on Saturday last. He was running engine 631 attached to extra No. 10, and when just east of Otterkill a part of the safety valve blew out, allowing the steam and boiling water to escape. Mr. Bryant climbed on top of the cab to see if he could fix the break, when he was struck in the breast by the escaping steam and blown to the ground, rolling down a steep embankment and being rendered unconscious. Neither the fireman nor conductor missed the engineer until the train had run about a mile, when it was stopped, and the conductor went back to find him. Mr. Bryant was found staggering down the track after his train, and still partially unconscious. The fire in the engine was pulled and the engine repaired so that it could be run back to this village, the train going on with the Greycourt pusher. Mr. Bryant says he does not remember anything from the time he fell from his engine until after his conductor met him. It is a wonder that he was not killed, as the train was running at the rate of 15 miles an hour when he fell off. As it was, one of his ankles was sprained, and he is sore from the top of his head to the soles of his feet.—*Port Jervis Gazette, Jan. 5.*

It Rained Crackers.

The fireman of the New York and Washington limited express seized a broom and sent a shower of Albert biscuits raining off the floor of the engine cab as the train came to a temporary rest in Broad street station on Saturday.

"See here, boy," called a drawing-room car conductor, who was lounging on the platform, "you're setting high-toned sweeping away a senator's lunch, eh?"

"Blame the things, I'm sick of 'em," answered the fireman. "I've been stuffin' 'em in ever since we left Elizabeth. Say, cull, you'd a dide. We was just gettin' out of the limits, and Bob was whoopin' her. Well, sir, we struck the tail end of a baker's wagon on a crossin' a half mile out of town. S' help me, it rained crackers. The cab was so full o' crackers that Bob an' me could hardly get around for that an' laughin', and the smokestack—great Caesar!—we was afraid the crackers in it 'ud put out the fire. There's crackers all over New Jersey."

"Baker hurt?"

"Naw. Fell on his head in a soft spot in the next field. Say, Bob, shall I let her go?"—*Philadelphia Press.*

Left.

Pat—"Soy, how soon will a train be here going East?" Station Agent at Albion—"The through freight passes in 30 minutes, but won't stop."

Pat—"Will it go slow so I can jump on?"

Albion Station Agent—"I don't know, but it will slack down there at the crossing so you can get on."

Pat—"What crossing?"

Albion Station Agent—"Oh, the one about half a mile west of here."

Pat (relieved)—"Wall, if I don't get on here I will go down and meet it and get on at the bridge."—*Detroit Free Press.*

A Ladies' Question.

Let me ask why the Pullman car conductors, stewards and porters on the road between Philadelphia and Jacksonville, by the Shenandoah Valley route, have the air as if the occupants of these "palace cars" are beings who must be kept down? Travelers, particularly women, are frequently a trying set. According to Gail Hamilton, they have an ingrained belief that a conductor will always lie the first time he is questioned, while there is a chance that he will tell the truth the second time. Still, I suppose it is part of the duty of a railway official to answer questions. Stupid people are certain to make a great many stupid inquiries, but are entitled to have things explained to them, so that they may go on their journey without mishap. We were a party of women of average intelligence and tolerable courage; but in half a day, beneath the iron rule which was now over us, our courage was all gone, and I, for one, felt that I should never understand anything again. We were consistently and, invariably snubbed, with one exception. The colored porter made me feel like a worm of the earth, and when we left one Pullman for another, then the new porter was usually a little worse than the last one. The conductor was generally so august a personage that, after one attempt, none of us dared to address him. The sight of his trig blue uniform sent a shudder through us. One of these officers varied his manner by making fun of some passengers, and audible comments upon them, to a fellow conductor. The riding is the roughest of any I ever experienced, but of that I would not complain.—*Correspondence New York Evening Post.*

The Whistle Nuisance.

With regard to the whistling of locomotives at crossings, the report of the Massachusetts Railroad Commission, just issued, says: "Four petitions have been acted on, and whistling has been forbidden at the several crossings covered by these petitions. The Board believes that this legislation is wise. They agree with their predecessors in holding that the value of the whistle as a danger signal is impaired by its constant use as a mere crossing signal; that such use inflicts a heavy penalty upon the innocent to protect the reckless and undeserving, and that at many crossings the whistle is simply a useless annoyance. It is not improbable that fatal accidents will occur at some of the crossings where whistling is now dispensed with. Indeed, it is certain that at some time they will occur, for such fatalities have happened, from time to time, when whistling was permitted; and its cessation will not relieve careless people from danger. But such accidents will not disprove the wisdom of the law. If the natural horror arising from the occurrence of a fatal casualty should ever lead to a condemnation of the statute and to a demand for its repeal, it should be remembered that the benefits of the law are constant, although they are not visible; that no law can always shield men from the results of their own recklessness, and that a highway crossing accident is almost impossible under any state of law, if travelers will use ordinary care."

Disuse of Second-Class Cars in England.

The Great Northern Railway evidently intends to abolish second-class carriages altogether. They will now have none, except on their main line trains and their London suburban service. But this is not the only company that has followed

the bold lead of the Midland. The Glasgow & Southwestern, the Scotch partner of the Midland, which forwards all its traffic from Carlisle to Glasgow, Greenock and the west coast, has since last summer entirely done away with second-class. The North British also, which occupies the same position with reference to Edinburgh and the east coast, has done the same in many districts. But it must be observed that all these companies run Pullman cars, and therefore there are still three classes on their express trains. When the Great Northern abolish second-class altogether they will be forced to admit third-class passengers to the "Flying Scotsman." The Irish mails will then be the only trains running north out of London without third-class carriages attached. In your note yesterday you seem to express an opinion that second-class carriages would be much missed by Londoners. Those who have the misfortune to live in the southern suburbs have always understood that second-class carriages were really third-class carriages with a big 2 painted on the door, in order that they might be attached to express trains and double fare charged for their use. Certainly if they were broken up and Great Northern or Midland thirds substituted, they never would be missed by any but the most enthusiastic of antiquarians.—*Correspondence St. James' Gazette, London.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Fitchburg, annual meeting, at the passenger station in Boston, at 11 a. m. Jan. 26.

Illinois Central, annual meeting, at the office in Chicago, March 10.

Newburg, Dutchess & Connecticut, annual meeting, at the office in Matteawan, N. Y., Jan. 28.

St. Louis & Cairo, special meeting, to vote on the question of leasing the road to the Mobile & Ohio, in New York, March 15.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Illinois Central, 4 per cent., semi-annual, payable March 1, to stockholders of record on Feb. 10.

Pacific Mail Steamship Co., 1½ per cent., quarterly, payable Feb. 1, to stockholders of record on Jan. 23.

Pullman Palace Car Co., 2 per cent., quarterly, payable Feb. 15, to stockholders of record on Feb. 1.

St. Louis & San Francisco, 3½ per cent., semi-annual, payable Feb. 10, to stockholders of record on Jan. 26.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *Michigan Engineering Society* will hold its annual meeting at Ann Arbor, on Tuesday, Jan. 26.

The *American Institute of Mining Engineers* will hold its next meeting in Pittsburgh, beginning on Tuesday, Feb. 16.

The *Master Car-Builders' Club* will hold its regular monthly meetings through the winter at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its monthly meetings at its rooms in the Boston & Albany passenger station in Boston, on the evening of the second Wednesday in each month.

The *Western Railway Club* will hold its regular monthly meetings at its rooms, No. 103 Adams street in Chicago, on the third Wednesday in each month.

Transportation in Congress.

In the Senate on Jan. 18:

Mr. Cullom (Ill.) submitted a report from the committee appointed to investigate the subject of the regulation of freight and passenger rates on railroads and water routes. With the report Mr. Cullom submitted a bill regulating interstate commerce, which he asked might be referred back to the committee, and that the committee be continued. The request was granted, and a resolution passed ordering to be printed 2,000 copies of the committee's report and the testimony taken before it.

The bill was accompanied by a voluminous report prepared by the committee, including several volumes of testimony taken at different points last summer, with several papers by various persons, which were submitted to the committee in writing during the session.

The Senate Committee on Commerce on Jan. 19 gave a hearing to the advocates and opponents of the bill authorizing the building of the bridge over Staten Island Sound for the Baltimore & Ohio road. One more hearing will be given before the report is made.

American Institute of Mining Engineers.

The following circular from Secretary R. W. Raymond is dated New York, Jan. 9:

"1. The 44th meeting of the Institute will be held at Pittsburgh, Pa., beginning Tuesday evening, Feb. 16, 1886. The Local Committee is composed of Messrs. W. R. Jones, Chairman, B. F. Jones, Wm. Metcalf, J. H. Ricketson and Jos. D. Weeks, Secretary.

"2. The session will be held at the rooms of the Iron Association, 77 Fourth avenue. Hotel headquarters will be at the Monongahela House. Hotel rates (at different houses) per day are \$2.50 to \$4.50. Applications for rooms in advance should be addressed to Jos. D. Weeks, Secretary, 77 Fourth avenue.

"3. The programme, as thus far determined, subject to future modifications, comprises sessions on Tuesday and Wednesday evening, Thursday morning and afternoon and Friday afternoon; excursions Wednesday morning and afternoon, and Friday morning; and opportunity is given for a dinner Thursday evening. A detailed programme will either be issued hereafter from this office, or will be distributed to members on their arrival.

"4. Arrangements have been made with the Trunk Line Commission, by which members and their families, having the proper certificate from the Secretary and paying full fare going, can obtain return fare at one-third the limited rate. This applies to the railroads under the Trunk Line Commission only. Stop-over privileges are not included. Members must obtain certificates beforehand from the Secretary, and present them at the time of purchasing their tickets for Pittsburgh.

"5. Members desiring to present papers at this meeting are requested to notify the Secretary (P. O. box 223, New York) immediately, and to forward as soon as practicable the manuscripts of their papers, or else such descriptions or abstracts thereof as will satisfactorily show their subject, nature and length, the number, character and size of illustrative drawings, etc."

Michigan Engineering Society

The Michigan Engineering Society will hold its next meeting at Ann Arbor, Mich., Jan. 26. The society now numbers

nearly 200 members, including a number of mechanical engineers. At the coming meeting all persons interested in civil and mechanical engineering are invited to attend.

General Baggage Agents' Association.

The General Baggage Agents' Association met in Cincinnati, Jan. 20. The usual routine business was transacted. A committee of undertakers presented a protest against the rules now in force as to the transportation of dead bodies, which was laid over for consideration.

ELECTIONS AND APPOINTMENTS.

American Society of Civil Engineers.—At the meeting on Jan. 6, the following candidates were elected: As Members: Maximilian Ferdinand Bonzano, Philadelphia; Franklin Ide Fuller, Portland, Or.; George Watson Kittredge, Zanesville, O.; Henry Wadsworth Reed, Waycross, Ga.; Henry Frederic Rudloff, Caracas, Venezuela, S. A.; Albert John Scherzer, Sonsonate, Salvador, Central America. As Associate: Calvin Tompkins, New York. As Junior: Harry Lee Van Zile, Troy, N. Y.

Atchison, Topeka & Santa Fe.—Mr. C. W. Smith, First Vice-President, will, from Feb. 1 next, act as General Manager, and will have full charge of the operating department of the road. From the same date Mr. A. A. Robinson, now General Manager and Chief Engineer, is appointed Second Vice-President and Chief Engineer, and will have full charge of all engineering work and new construction. The change is made in order that Mr. Robinson may devote his whole time to the important new works, which the company expects to undertake.

Mr. H. G. Krake is appointed Live Stock Agent, with office in Topeka, Kan., in place of W. P. Herring, resigned.

Baltimore & New York.—Mr. Charles Ackenheil has been appointed Chief Engineer, with office in Elizabeth, N. J. He is also Chief Engineer of the Staten Island Rapid Transit Co., having charge of the construction of the Baltimore & Ohio's extension to New York. Mr. Ackenheil was formerly Chief Engineer of the Pittsburgh Southern and more recently Engineer of bridges on the Baltimore & Ohio's Philadelphia line.

Baltimore & Ohio.—Mr. Robert Rowley is appointed Contracting Agent in Pittsburgh in place of S. D. Culbertson, transferred.

Beech Creek, Clearfield & Southwestern.—At the annual meeting, Jan. 11, the following officers were chosen: President, Wm. A. Wallace, Clearfield, Pa. Directors, G. H. Platt, Peale, Pa.; W. S. Nearing, Jersey Shore, Pa.; S. R. Peale, Lock Haven, Pa.; Daniel Beach, Watkins, N. Y.; Joseph M. Gazzam, John G. Reading, Philadelphia; Charles C. Clarke, Chauncey M. Depew, L. A. Robertson, H. McK. Twombly, Cornelius Vanderbilt, Wm. K. Vanderbilt, New York.

Bradford, Bordell & Kinzua.—At the annual meeting in Bradford, Pa., Jan. 11, the following officers were chosen: President, J. J. Carter; Vice-President, Thomas Loomis; Secretary, John E. Ransom; Treasurer, George A. Eekbert.

Chesapeake & Ohio.—Mr. Henry T. Wickham has been appointed General Solicitor, with office in Richmond, Va., and will have charge of the law business of this company and its controlled lines.

Chicago & North Western.—In the Law Department the title of General Solicitor has been changed to General Counsel, and of Assistant General Solicitor to General Attorney. Mr. William C. Goudy is General Counsel, and Mr. William B. Keep is General Attorney.

Cincinnati, Hooking Valley & Huntington.—At the annual meeting recently the following directors were chosen: H. L. Niles, Toledo, O.; Marcus Boggs, Chillicothe, O.; C. M. Overman, Hillsboro, O.; L. W. Waldron, Perry, O.; P. S. Gatch, D. K. Harvey, John M. Pattison, New Milford, O.; John L. Boyer, R. B. Wilson, Cincinnati. The board elected D. K. Harvey, President; L. W. Waldron, Secretary.

Cincinnati Indianapolis, St. Louis & Chicago.—Mr. Theodore T. Brown is appointed Traveling Passenger Agent, with headquarters in Chattanooga, Tenn., in place of Grant K. Lowry, deceased.

Cincinnati, Selma & Mobile.—Mr. C. H. Cromwell has been appointed General Freight and Passenger Agent; H. M. Abbett, Treasurer; J. C. McKenzie, Train Dispatcher. These officers are all also officers of the Western Railroad of Alabama.

Connecticut River.—At the annual meeting in Springfield, Mass., Jan. 20, the old directors were re-elected without change.

Denison & Washita Valley.—The officers of this new company are: President, John Scullen; Vice-President, W. R. Munson; Secretary, A. H. Coffin. Office at Denison, Texas.

East Tennessee, Virginia & Georgia.—Mr. Charles N. Knight has been appointed Division Passenger Agent, with office in Atlanta, Ga. He recently represented the road in Chicago.

Emigrant Clearing House.—The Joint Executive Committee has appointed Mr. Charles F. Doane Joint Agent in charge of the new emigrant clearing house, with office at Castle Garden, New York. Mr. Doane is now Eastern Passenger Agent of the New York Central.

Erie & Pittsburgh.—At the annual meeting in Erie, Pa., Jan. 16, the following officers were chosen: President, Wm. L. Scott; Vice-President, James McCarter; directors, Wm. Brewster, Sidney T. Fairchild, George B. Roberts, M. H. Taylor, Charles Tracy; Secretary and Treasurer, Wm. Brewster. The road is leased to the Pennsylvania Company.

Fremont, Elkhorn & Missouri Valley.—The following circular from President M. Hughitt is dated Chicago, Jan. 18: "Mr. W. B. Linsley, General Manager of this company, having requested to be relieved of the duties of that office, Mr. W. F. Fitch is appointed his successor, to take effect this date. Office at Missouri Valley, Iowa."

Galveston, Sabine & St. Louis.—The United States Circuit Court has appointed John M. Duncan Receiver of this road.

General Baggage Agents' Association.—At the meeting in Cincinnati, Jan. 20, the following officers were chosen: President, J. D. Marston; Vice-President, R. R. Bentley; Secretary, J. E. Quick.

Houston & Texas Central.—The following appointments are announced: J. V. Brown, Texas Passenger Agent, with headquarters at Houston; C. W. Newton, Traveling Passenger Agent, headquarters at New Orleans.

Lehigh Valley.—At the annual meeting in Philadelphia, Jan. 19, the following officers were chosen: President

Elisha P. Wilbur; directors, James I. Blakslee, Wm. L. Conyngham, John R. Fell, John B. Garrett, Charles Harts-horne, Wm. A. Ingham, Robert A. Lamberton, George B. Markle, Ario Pardee, Joseph Patterson, Robert H. Sayre, Charles O. Skeer.

Little Rock & Fort Smith.—Mr. A. S. Horner is appointed Superintendent, to date from Feb. 1, in place of F. A. Lister, resigned. Mr. Horner is now on the Denver & Rio Grande.

Little Rock, Mississippi River & Texas.—Mr. A. L. Horner is appointed Superintendent, to date from Feb. 1, in place of F. A. Lister, resigned.

London & Port Stanley.—At the annual meeting in London, Ont., Jan. 15, the following officers were chosen: President, James Magee; Vice-President, M. Smith; directors, George Peawell, A. Cleghorn, James Egan, Joseph Hickson, Joseph Hobson, John McClary, Robert Pritchard, Charles Stiff, W. P. K. Street; Secretary, James Bowman.

Memphis, Selma & Brunswick.—Mr. E. F. McHenry, of Memphis, Tenn., has been appointed Receiver by the United States Circuit Court.

Mexican Central.—Mr. A. C. Michaelis has been appointed General Freight and Passenger Agent, with office in the city of Mexico.

Monongahela Navigation Co.—At the annual meeting in Pittsburgh, Jan. 15, the following officers were chosen: President, M. K. Moorhead; Secretary and Treasurer, Wm. Bakewell; Managers, Joseph Albree, Alex. Bradley, Felix R. Brunot, A. C. Bakewell, John Harper, George B. Logan, J. B. Murdoch, J. B. Moorhead, A. E. W. Painter, J. B. Sweitzer.

Montreal, Portland & Boston.—At a meeting held in Montreal, Jan. 20, the following directors were chosen: Bradley B. Smalley, Albert P. Cross, A. H. Gilmore, J. C. Hatton, George W. Hendee, John L. Morris, Armine D. Nicolls. The election is disputed on the claim that stock was illegally voted.

New York, Lake Erie & Western.—Mr. George W. Rittine, having been appointed General Manager of the Erie's consolidated lines, to be known as the Erie Despatch, will, in addition to his duties as such, also act as the western representative of the Freight Department of this company, in charge of through east-bound traffic, with office at Chicago.

New York, Ontario & Western.—At the annual meeting in New York, Jan. 20, the following directors were chosen: Charles Duggin, T. P. Fowler, John Greenough, H. J. Hayden, Richard Irwin, Jr., J. B. Kerr, Arnold Marcus, H. Pearson, Joseph Price, Charles Russell, Thomas Swinyard, E. S. Wheeler, E. F. Winslow. This is in large part a new board, in which the English stockholders have a considerable representation.

The new board subsequently elected Thomas Powell Fowler President; John B. Kerr, First Vice-President; Joseph Price, Second Vice-President.

Niagara Falls & Whirlpool.—Mr. J. E. Shields, of New York, has been appointed Consulting Engineer of this new company.

Pennsylvania.—Mr. Frank E. Ellmaker is appointed Superintendent of the Belvidere Division in place of Mr. J. A. Anderson, assigned to other duties. Mr. Ellmaker was recently Assistant Engineer of the New York Division.

Mr. J. K. Shoemaker is appointed Passenger Agent for the Middle District in place of Capt. J. N. Abbey, deceased, with office at No. 1,018 Broad street, Philadelphia.

Pittsburgh, Cincinnati & St. Louis Leased Lines.—Elections of officers have been made as follows: *Columbus & Xenia.*—President, Henry C. Noble; Secretary and Treasurer, Robert S. Smith. *Richmond & Miami.*—President, L. B. Gunkel; Secretary, J. H. Winter.

Pittsburgh East End.—At the annual meeting in Pittsburgh, Jan. 11, the following were elected: President, N. M. McDowell; directors, James H. Lindsay, George B. Hill, John Bissell, Wm. Semple, John D. Scully, Joshua Rhodes, Wilson McCandless, W. L. Chalfant.

Pittsburgh Junction.—At the annual meeting in Pittsburgh, Jan. 18, the following were chosen: President, Thomas M. King; directors, James Callery, John W. Chalfant, C. L. Fitzhugh, Robert Garrett, C. B. Herron, Wm. Metcalf, Reuben Miller, Henry W. Oliver, Jacob Painter, Jr., A. E. W. Painter, Samuel Spencer, Wm. Vankirk.

Mr. J. Morton Hall is appointed Superintendent. He is also assistant to the General Manager of the Pittsburgh & Western road.

Pittsburgh & Lake Erie Leased Lines.—At the annual meetings in Pittsburgh last week the following officers were chosen: *Dawson, Broadford & Mt. Pleasant.*—President, W. C. Quincy; Directors, John Newell, David Hostetter, James I. Bennett, M. W. Watson, James M. Bailey, G. T. Rafferty. *Monongahela East Shore.*—President, W. C. Quincy; Directors, John Newell, David Hostetter, James I. Bennett, M. W. Watson, Henry Hice, Herbert Du Puy, William M. Lyon. *Monongahela & Youghiogheny.*—President, W. C. Quincy; Directors, John Newell, David Hostetter, James I. Bennett, Henry Hice, Herbert Du Puy, William M. Lyon. *Pittsburgh, McKeesport & Youghiogheny.*—President, W. C. Quincy; Directors, Cornelius Vanderbilt, Wm. K. Vanderbilt, James Tillinghast, J. H. Devereux, John Newell, David Hostetter, James I. Bennett, M. W. Watson, Henry Hice, Directors, T. D. Devereux, John Newell, David Hostetter, James I. Bennett, M. W. Watson, Henry Hice, Jacob Hendrick. *Westmoreland & Fayette.*—President, W. C. Quincy; Directors, John Newell, David Hostetter, James I. Bennett, M. W. Watson, James M. Bailey, G. T. Rafferty.

Pittsburgh & Preston County.—The directors of this new company are: George H. Armstrong, Wm. S. Armstrong, Samuel Derby, John H. Feather, Charles Kautner, Joseph W. Michael, Wm. H. Miller, S. R. Scott, Andrew Spindler, all of Preston County, West Virginia.

Pittsburgh & Northeastern.—At the annual meeting in Pittsburgh, Jan. 11, the following directors were chosen: J. H. Connors, A. D. Neild, R. D. Patterson, John S. Ferguson, Col. S. M. Jackson, Apollo, Pa.; A. S. Montgomery, South Bend, Ind.; H. H. Schwaneke, Marshall, Ill.; Frank Stewart, Murrysburg, Pa. W. C. Mobley was elected President, A. J. Montgomery Vice-President, and S. M. Jackson Treasurer.

Pittsburgh & Western.—Mr. J. Morton Hall is appointed Assistant to the General Manager in place of Mr. Patton, transferred. Mr. W. L. Cromlish succeeds Mr. Hall as Assistant General Freight Agent, and Mr. Samuel D. Culbertson is appointed Contracting Agent in Pittsburgh in place of Mr. Cromlish.

Poughkeepsie Bridge Co.—At a meeting held in New York last week the following directors were chosen: George B. Pelton, John J. Platt, Poughkeepsie, N. Y.; J. H. Appleton, Springfield, Mass.; J. M. Jackson, C. W. Needham, Chicago; Edward Ellsworth, Philadelphia; F. P. Dickinson, Samuel Elliott, E. J. Sterling, New York. The board elected J. H.

Appleton, President; George B. Pelton, Vice-President; E. J. Sterling, Secretary; J. M. Jackson, Treasurer; P. P. Dickinson, Chief Engineer.

Portland & Ogdensburg.—At the annual meeting in Portland, Me., Jan. 19, the following directors were chosen: Samuel J. Anderson, J. P. Baxter, Francis Fessenden, George E. B. Jackson, Horatio N. Jose, W. F. Milliken, R. M. Richardson, J. S. Ricker, S. R. Small, Portland, Me.; C. H. Amsden, Concord, N. H. The board elected Samuel J. Anderson President; Charles H. Foye, Clerk; John W. Dana, Treasurer; Jonas Hamilton, Superintendent; John F. Anderson, Chief Engineer.

St. Louis, Belleville & Eastern.—The incorporators of this new company are: S. L. Dwight, B. M. Sadler, Centralia, Ill.; Henry Schurman, Hanover, Ill.; H. Clay Conde, St. Louis; Paul Jones, New York.

Saratoga, Mt. McGregor & Lake George.—At the annual meeting in Canajoharie, N. Y., Jan. 14, the following directors were chosen: James Arkell, J. W. Drexel, D. H. Fonda, A. A. DeForest, John Kellogg, J. S. L'Amoreaux, Homer N. Lockwood, A. G. Richmond, Adam Smith, E. S. Smith, Titus Sheard, John Warner, J. D. Wendell, George West.

Sioux City & Pacific.—The following notice from President M. Hughitt is dated Chicago, Jan. 18: "Mr. W. B. Linsley, General Manager of this company, having requested to be relieved of the duties of that office, Mr. W. F. Fitch is appointed his successor, to take effect this date. Office at Missouri Valley, Iowa."

Southern Pacific Co., Atlantic System.—The following from General Superintendent E. G. Thompson is dated Houston, Tex., Jan. 13:

"The following appointments and changes are made in the officers of this company, effective Jan. 15: Mr. Wilbert Irwin is appointed Master of Transportation, vice Mr. C. W. Kouns, resigned. Mr. J. C. Buchanan is appointed Superintendent Louisiana Division, with headquarters at Houston, Tex., vice Mr. W. Irwin, promoted.

"The office of Master Mechanic Louisiana Division having been abolished, the jurisdiction of Mr. J. J. Ryan, Master Mechanic of the San Antonio and El Paso divisions, is extended over the Louisiana Division, and his instructions will be obeyed accordingly."

State Island Rapid Transit Co.—Mr. Charles Ackenhell is appointed Chief Engineer and will have his office in Elizabeth, N. J. He is also Chief Engineer of the Baltimore & New York road.

Terre Haute & Logansport.—At the annual meeting recently the following officers were chosen for this company, which is controlled by the Terre Haute & Indianapolis Co.: President, W. R. McKee; Secretary and Treasurer, George E. Farrington.

Texas & Pacific.—Mr. J. S. Wilkes is appointed Treasurer and Mr. Frank Trumbull Auditor for the Receivers, with offices in Dallas, Texas.

Mr. A. A. Egbert has been appointed General Superintendent. He was recently Superintendent of the Colorado Division of the Union Pacific.

Toledo, Saginaw & Muskegon.—The directors of this new company are: W. Mason, Muskegon, Mich.; A. W. Wright, Alma, Mich.; J. M. Ashley, Wm. Baker, John Cummings, David Robison, Toledo, Ohio.

Union Pacific Leased Lines.—At meetings held in Omaha, Neb., last week, directors were chosen as below: *Omaha, Niobrara & Black Hills.*—Charles Francis Adams, Jr., Frederick L. Ames, Ellison Atkins, S. R. Callaway, F. Gordon Dexter, Sidney Dillon, T. L. Kimball. *Omaha & Republican Valley.*—The same directors as above.

Waynesburg & Washington.—At the annual meeting in Washington, Pa., Jan. 11, the following officers were chosen: President, George B. Roberts; directors, J. J. Brooks, J. N. DuBarry, W. T. Lantz, Julius Lemoyne, James McCrea, J. N. McCullough, Thomas D. Messler, J. G. Ritchie, D. A. Spragg, Jacob Swart, J. F. Temple, Wm. Thaw. The board elected Thomas D. Messler, Vice-President; S. B. Liggett, Secretary; John E. Davidson, Treasurer; John W. Renner, Auditor; C. E. Bower, Superintendent.

Western Railroad Association.—At the annual meeting in Chicago, Jan. 12, the following directors were chosen: B. F. Ayer, B. C. Cook, A. L. Osborn, H. B. Stone, John Newell, F. A. Nims, T. F. Withrow, J. C. McMullin, John B. Carson, H. H. Poppleton, Roswell Miller, S. R. Callaway. The board elected B. F. Ayer President; George Payson, General Counsel and Treasurer; C. R. Babeuf, Secretary.

Woodruff Sleeping & Parlor Coach Co.—Mr. R. M. Hemphill has been appointed Agent for this company at Peoria, Ill., with headquarters at Union Depot.

PERSONAL.

—Mr. C. W. Kouns has resigned his position as Master of Transportation of the Atlantic System of the Southern Pacific Company.

—Mr. Geo. B. Ewing, widely known by his connection with the Buckeye Iron & Brass Works, has entered the service of the Ashcroft Manufacturing Co. and the Consolidated Safety Valve Co. His address is No. 111 Liberty street, New York.

—Mr. Henry A. Little, lately associated with W. R. Ellis, of New York and Boston, and formerly with Aaron French & Co., will in future represent the United States Converse Spring Co., of Jersey City, N. J., having an office in No. 34 Duncan Building, Pine street, New York.

—Mr. Robert H. Small, Assistant Auditor of the Baltimore & Ohio, was found dead on the bank of the St. John River, near Palatka, Fla., Jan. 14. Mr. Small was in Florida on his wedding tour, but had exhibited for a week or more symptoms of mental aberration, and is supposed to have wandered away from his hotel and to have died from exposure.

—A Little Rock dispatch says that Mr. F. A. Lister has resigned his position as Superintendent of the Little Rock & Fort Smith and the Little Rock, Mississippi River & Texas roads. Mr. Lister was formerly on the Camden & Atlantic and went from that road to the Mexican National, returning from Mexico about two years ago to take charge of the Little Rock lines.

—Mr. Charles J. Canda, who has been nominated by the President as Assistant Treasurer of the United States at New York, is President of the Toledo & Ohio Central Co., and was formerly President of the Cleveland, Akron & Columbus. He is director in several other companies, having been concerned in a number of roads, both on his own account and in connection with Hon. Samuel J. Tilden.

—Mr. A. A. Robinson, for some time past General Manager and Chief Engineer of the Atchison, Topeka & Santa Fe Co., has been relieved from his duties in connection with

the operating department, and will hereafter, as Second Vice-President, devote his entire time to the engineering department and new construction. In making this change the directors expressed full appreciation of Mr. Robinson's faithful and successful service as General Manager.

—Mr. J. E. Short died suddenly at his residence in Lowell, Mass., Jan. 19, aged 79 years. Mr. Short began life as driver of a stage coach between Lowell and Boston. When the Boston & Lowell Railroad was opened, 50 years ago, he went on the road as conductor and held that position for 30 years. He was then made ticket agent at Lowell, and finally retired on account of old age four years ago, having passed the very unusual term of 46 years in the service of one company.

—Mr. Robert M. Hasbrouck, a prominent civil engineer, died Jan. 19 at his residence at Schaghticoke, near Troy, N. Y., aged 63 years. He was born in Albany, and graduated at Lafayette College, in Easton, Penn. He then secured a position as engineer on the Erie Canal. Then for a number of years he was engaged on the Croton Aqueduct, and was one of the constructing engineers of the High Bridge. Afterward he resumed work on the Erie Canal. He was City Engineer of Troy for a long time, and for the past two years had been Deputy State Engineer. Mr. Hasbrouck had served two years in the board of supervisors of his county, and one term in the Legislature of the state.

—Mr. D. N. Pickering, formerly Master Mechanic of the Boston & Worcester R.R., then Treasurer of the Globe Works, Boston, and of late years General Manager of the Central Iowa Railroad, died in Boston Jan. 11, after a long and painful illness. Mr. Pickering was a native of New Hampshire. He went to Boston when quite young and engaged in the service of the Boston & Providence Co., being associated with the late George S. Griggs. He shortly afterwards went to the old Boston & Worcester road, where he became Master Car-Builder and then Master Mechanic, which latter position he left in 1851 to engage in private business, to which he gave his undivided attention until 1872, when President Cate, of the Central Iowa, availed himself of his signal abilities to co-operate with his plans for the redemption of that then unfortunate property, in which labor Mr. Pickering continued until late in 1883, when failing health admonished him to throw off the responsibilities and burdens of the work. Mr. Pickering was known throughout Iowa and among railroad men in the West as a careful, upright, indefatigable officer and servant of his corporation. Prompt of action, fearless of personal consequences, a firm unwavering friend, an honest and unassuming enemy, he had all those traits of character to make him at once respected and liked by those who served under him, and trusted and honored by those whose interests were entirely in his hands. Mr. Pickering leaves a wife and three children, and, it is understood, a considerable fortune, the fruit of frugality, care and good judgment.

TRAFFIC AND EARNINGS.

Anthracite Coal Tonnage.

Anthracite coal tonnage for December and the year ending Dec. 31, as given by the statement of Mr. John H. Jones, the Official Accountant, was as follows, the statement including the entire production of anthracite coal, excepting that consumed by employees and for steam and heating purposes about the mines:

	December.	1885.	1884.	1883.	1882.
Phila. & Reading.....	1,135,716	881,748	11,080,780	11,163,020	11,163,020
Lehigh Valley.....	629,057	505,271	6,107,445	5,035,254	5,035,254
Del., Lack. & W.....	388,944	476,376	4,987,834	5,204,362	5,204,362
Del. & H. Canal Co.....	318,214	295,174	3,301,874	3,362,080	3,362,080
Pennsylvania R. R.....	301,348	242,115	3,393,685	3,169,287	3,169,287
Penn. Coal Co.....	145,642	131,019	1,500,686	1,397,946	1,397,946
N. Y., L. E. & W.....	77,904	137,736	651,226	523,546	523,546
Total.....	2,996,825	2,669,439	31,623,530	30,756,995	30,756,995

The statement says: "Corrected statement of the tonnage of New York, Lake Erie & Western for 1884 increases the total production for that year 38,702 tons. In addition, 46,247 tons, which was included in the tonnages of other interests for 1884, is claimed as chargeable to that company." The increase for the month was 337,386 tons, or 12.3 per cent.; for the year, 866,535 tons, or 2.8 per cent. The actual division of tonnage was as follows, comparison being made with the allotment fixed by the agreement for 1885 and with actual divisions for 1884 and 1883:

	1885.	1884.	1883.	1882.
Philadelphia & Reading.....	38.85	36.94	36.30	38.50
Lehigh Valley.....	19.60	19.31	19.50	19.70
Delaware, Lackawanna & Western.....	16.05	15.77	16.92	16.09
Delaware & Hudson Canal Co.....	11.00	10.44	10.93	11.10
Pennsylvania Railroad Co.....	8.00	10.73	10.30	8.70
Pennsylvania Coal Co.....	5.00	4.75	4.55	4.80
New York, Lake Erie & Western.....	1.50	2.06	1.70	1.20
Total.....	100.00	100.00	100.00	100.00

The stock of coal on hand at tidewater shipping points, Dec. 31, 1885, was 754,545 tons; on Nov. 30, 670,403 tons; increase, 84,142 tons. The amount on hand Dec. 31, 1884, was 874,681 tons, showing 120,136 tons less than a year ago.

The division of the output among the three great districts of the anthracite region was as follows:

	1885.	1884.	1883.	1882.
Wyoming.....	16,236,470	51.3	15,716,455	51.1
Lehigh.....	5,898,634	18.7	5,562,226	18.1
Schuykill.....	9,488,426	30.0	9,478,314	30.8
Total.....	31,623,530	100.0	30,756,995	100.0

The Wyoming District continues to be the growing section of the anthracite region, and the Schuykill District the steadily falling one. The Lehigh District does not vary greatly, and must always retain its hold upon the trade on account of the peculiar quality of the coal which it supplies.

Eastern competitive tonnage, including all coal which, for final consumption or in transit, reaches any point on Hudson River or the Bay of New York, or which passes out of the capes of the Delaware, was:

	1885.	1884.	1883.	1882.
Tons.....	11,956,587	12,008,855	13,148,185	12,018,704
P. c. of total.....	37.8	39.1	41.4	41.3

The decline of eastern tonnage on an increase in the total shipments indicates an increase in the western trade, which the complete figures of distribution, which are not yet made up, will probably show.

Coal.

Coal tonnages for the week ending Jan. 9 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite.....	413,421	527,901	D. 114,480	21.6
Eastern bituminous.....	137,282	134,215	I. 3,067	2.3
Coke.....	66,087	37,480	I. 28,607	76.3

The anthracite trade is in an unsettled condition still, and nothing has been done toward an agreement for the new year. The conflict between Mr. Gowen and the Reading Receivers makes that company's policy still uncertain, while the Lehigh Valley is said to be unwilling to enter into any combination, and the Pennsylvania Railroad will refuse to have anything to do with one.

The coal tonnage of the Pennsylvania Railroad for the week ending Jan. 9 was:

	Coal.	Coke.	Total.
Line of road.....	101,907	65,311	167,218
From other lines.....	59,692	750	60,442
Total.....	161,599	66,061	227,660
Year to Jan. 9.....	192,985	84,391	277,376

Cumberland coal shipments for the nine days ending Jan. 9 were 54,611 tons; last year, 50,979; increase, 3,632 tons, or 7.2 per cent.

Coal shipments by sea from Seattle, Wash. Ter., last year were 193,175 tons, against 189,222 in 1884, an increase last year of 3,953 tons, or 2.1 per cent. Local demand took about 32,000 tons, making the total output of the mines 225,000 tons for the year.

The coal tonnage of the Chesapeake & Ohio Railroad for the year ending Dec. 31 was:

	1885.	1884.	Inc. or Dec.	P. c.
Coal.....	1,170,398	885,395	I. 285,003	32.2
Coke.....	126,391	81,515	I. 44,876	55.1
Total.....	1,296,789	966,910	I. 329,879	34.1

There was an increase in all classes of coal, but especially in the New River steam coals.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Year to Dec. 31:					
	1885.	1884.	Inc. or Dec.	P. c.	
Ala. Gt. South.....	\$1,076,371	\$1,165,102	D. \$88,731	7.6	
Char., Col. & A.....	810,437	775,104	I. 35,333	4.6	
Cin., N. O. & T. P.....	2,681,859	2,658,185	I. 23,674	0.9	
Cin., W. & Balt.....	1,707,146	1,824,647	D. 117,501	6.9	
Cleve., Ak. & C.....	482,780	479,381	I. 3,399	0.7	
Col. & Greenville.....	697,232	686,963	I. 10,269	1.5	
Den. & R. G. W.....	1,011,177	864,716	I. 146,461	16.9	
Fla. Ry. & N. Co.....	991,894	983,251	I. 8,643	0.9	
Georgia Pacific.....	679,344	600,182	I. 79,162	13.2	
Ill. Central.....	6,495,004	6,158,312	I. 336,692	5.4	
South. Div.....	4,440,573	4,320,132	I. 120,441	2.8	
Iowa lines.....	1,656,436	1,712,390	D. 55,954	3.3	
Kansas City, Ft. Scott & Gulf.....	2,514,107	2,422,443	I. 91,664	3.8	
Kan. City, Spr. & Mem.....	1,563,873	1,204,274	I. 299,599	24.8	
N. O. & Nor'west.....	698,287	597,446	I. 100,841	16.4	
Rich. & Dan.....	3,900,258	3,873,715	I. 26,543	0.7	
St. L., A. & T. H.....	1,252,943	1,323,926	D. 70,983	5.4	
Main Line.....	761,503	741,150	I. 20,353	2.8	
Belleville Line.....	1,237,358	1,040,033	I. 197,325	19.0	
Texas & St. L.....	486,151	507,207	D. 21,116	4.2	
Vicks. & Mer.....	449,581	292,842	I. 156,739	53.5	
Va. Midland.....	1,514,174	1,590,097	D. 75,923	5.0	
Wab., St. L. & P.....	13,845,686	14,011,063	D. 165,377	1.2	
Western N. C.....	466,947	435,434	I. 31,513	7.2	

Eleven months to Nov. 30:					
Des. M. & Ft. D...	\$347,420	\$324,597	I.	\$22,823	7.0
Net earnings...	102,617	95,375	I.	7,242	7.0
Gal. H. & S. An.	2,902,987	2,618,439	I.	284,528	10.9
Net earnings...	1,377,742	796,216	I.	581,526	72.9

Houston & Tex. Cent.....	2,412,858	2,311,024	I.	101,834	4.
Net earnings...	536,915	270,583	I.	266,332	98.
Louisiana West...	548,671	424,717	I.	123,954	29.
Net earnings...	290,439	183,758	I.	106,681	58.
Morgan's L. & T.	3,720,542	3,156,069	I.	564,473	18.

Morgan S. & L.	5,120,000	5,108,600	I.	501,775	18
Net earnings...	1,292,280	968,503	I.	323,777	33
Tex. & N. Ori'ns.	892,232	776,387	I.	115,845	14
Net earnings...	408,838	303,549	I.	105,289	34
Month of October:					
Dayton & Iron...	\$15,328	.....	.....	.....	..

2	Net earnings...	3,215				
0	Oregon Improve-					
7	ment Co.....	309,358	\$333,129	D.	\$23,771	7
6	Month of November:					
6	Den. & R. G. W..	\$98,564	\$103,961	D.	\$5,397	5
		25,000	25,000	D.	0,000	

Net earnings ..	35,022	37,091	D.	2,069	5
Des. M. & Ft. D.	38,305	33,734	I.	4,571	13
Net earnings ..	14,999	9,584	I.	5,415	50
Gal., Ha. & S. An.	348,510	298,159	I.	50,351	16
Net earnings...	190,010	150,373	I.	39,637	21
Hous. & Tex. C.	412,626	250,449	I.	162,177	64

Net earnings...	163,938	69,700	L.	94,238	135
Louisiana West...	64,238	54,526	L.	9,712	17
Net earnings...	40,169	32,113	L.	8,056	25
Minnesota & N.W.	35,242	.....	.....	.....	.....
Net earnings...	12,273	.....	.....	.....	.....
Morgan's La. & T.	473,588	424,466	I.	49,122	11

Cotton.

Cotton movement for the week ending Jan. 15 is reported as follows, in bales:

Interior markets:	1886.	1885.	Inc. or Dec.	P. c.
Receipts.....	43,661	66,537	D. 22,876	34.1
Shipments.....	56,239	82,463	D. 26,224	31.8
Stock, Jan. 15.....	513,993	304,859	I. 209,134	68.6

Seaports:	1886.	1885.	Inc. or Dec.	P. c.
Receipts.....	108,488	130,951	D. 22,463	17.1
Exports.....	98,155	165,018	D. 66,863	40.5
Stock, Jan. 15.....	1,106,586	945,911	I. 160,675	17.0

The movement for the week was small, owing to cold and stormy weather. The total movement from plantations for the crop year to Jan. 15 is estimated at 5,022,367 bales; the increase, as compared with last year, is 305,214 bales; the increase, as compared with 1883-4 is 447,719 bales, and the increase over 1882-3 is 115,572 bales.

Cumberland coal shipments for the week ending Jan. 16 were 33,338 tons. Total to Jan. 16 this year, 87,849; last year, 79,325; increase, 8,524 tons, or 10.8 per cent.

California Through Passenger Travel.

The San Francisco Bulletin of Jan. 13 says: "Through travel by rail was lighter last year than in any of the previous three years, both in coming and going. The through passenger traffic by rail for the past 16 years, which embraces nearly the entire history of this travel, has been as follows:

Arrived.		Departed.		Arrived.		Departed.	
1870.....	32,241	23,795	1878.....	37,556	25,938		
1871.....	29,817	21,896	1879.....	36,389	25,010		
1872.....	31,040	21,645	1880.....	34,289	30,397		
1873.....	44,370	23,489	1881.....	47,107	37,191		
1874.....	55,509	24,782	1882.....	58,113	37,813		
1875.....	74,889	30,422	1883.....	73,700	40,107		
1876.....	60,565	37,636	1884.....	58,428	37,549		
1877.....	47,435	31,253	1885.....	56,957	35,924		

"The total for the 16 years was 781,396 arrived and 477,824 departed. The roads under the Southern Pacific system carried 92,981 through passengers last year. The largest record in the history of this travel was in 1883, when the roads carried 113,807 and the next largest was in 1875, when the total was 105,311. These are the only two years when the number reached 100,000 for the year. During the past 16 years there has been a net gain to California in through overland travel of 306,570. This is probably a third of the present population of the state. All of this gain has not inured to this state exclusively, as some have sought homes in Nevada, Oregon and the outlying territories. But the state has derived benefit from the influx, no matter where the people have settled on this coast."

Chicago East-Bound Pool.

A meeting was held in New York, Jan. 14, for the purpose of further considering the questions relating to the new pool on east-bound business. All the roads concerned were represented. Mr. George R. Blanchard was present and announced his acceptance of the position of Commissioner of the new pool, to which he was chosen at the Chicago meeting. Considerable progress was made at this meeting in arranging the details of the new pool.

Western Freight Association.

The business done in this Association for November and December was as follows:

	West.	East.	Total.
Through freight pool.....	\$117,469	\$293,849	\$411,358
Omaha pool.....	237,607	84,321	321,928
Range cattle pool.....		24,464	24,464
Total.....	\$355,016	\$402,634	\$757,650

The Burlington and the Rock Island were over, the other lines short of their proportions.

Northwestern Traffic Association.

The traffic in this Association for December is reported as follows:

	Tons.	Revenue.
West-bound.....	21,494	\$120,938
East-bound.....	12,190	42,272
Wheat milled at local points.....	6,228	15,464
Total.....	39,912	\$178,674

West-bound traffic shows an increase, but east-bound a large decrease from December, 1884.

St. Louis Live Stock Traffic.

St. Louis receipts and shipments of live stock for the year ending Dec. 31 were as follows:

	Receipts.		Shipments.	
	1885.	1884.	1885.	1884.
Cattle, head.....	389,322	453,960	235,195	315,703
Hogs.....	1,461,021	1,487,240	790,320	675,713
Sheep.....	371,421	389,724	233,525	248,961
Horses and mules.....	39,399	42,964	35,543	40,065
Total, head.....	2,261,163	2,373,888	1,294,583	1,280,442
Carloads.....	41,858	43,269	19,854	22,855

The deliveries to packers and for city use in 1885 were 154,127 cattle, 670,701 hogs, 187,896 sheep and 3,856 horses and mules. There was a decrease in all classes of receipts, and also in all the shipments except those of hogs.

Pacific Coast Association.

The earnings in this Association in December were: West-bound, \$49,630; east-bound, \$18,971; total, \$68,601. The Alton, the Rock Island and the Missouri Pacific were over their proportions, the other lines short.

Colorado-Utah Association.

The earnings in business in this Association in December were: West-bound, \$57,898; east-bound, \$21,592; total, \$79,490. The Alton, the Burlington and the Wabash were somewhat over their proportions, the other lines being short of theirs.

Western Passenger Committee.

A meeting of general passenger agents was held in Cincinnati this week, at which a Western Passenger Committee was organized, which will take the place of the Central Passenger Committee. The organization is based on the trunk line agreement, and will take effect as soon as approved by the respective companies.

RAILROAD LAW.

Parallel and Competing Railroads.

In the South Pennsylvania injunction cases, the Circuit Court holds that the case undoubtedly comes within the provision of the Pennsylvania constitution which forbids the consolidation of parallel and competing roads. The South Pennsylvania could not be a competing line to the Pennsylvania Railroad until it was finished and in operation; nevertheless, in its incomplete state it is still a parallel road, and as such its purchase would come under the prohibition. The decision is to be submitted to the Supreme Court for review, all parties consenting to as early a hearing as possible.

OLD AND NEW ROADS.

Baltimore & Ohio.—Work on the Schuylkill River East Side line in Philadelphia is progressing rapidly, and the work of grading is going on at several different points. Two of the piers for the bridge across the Schuylkill River are nearly completed, and the caisson for a third is in place. The road-bed is nearly ready for the track from the bridge to Gray Ferry, and work is also in progress on the tunnel through which the road passes under the Gray Ferry road and the Philadelphia, Wilmington & Baltimore tracks. Beyond that point the road-bed is finished to the arsenal, and from that point to Arch street the right of way has been secured and preparations made to begin grading. The second tunnel, near Thirtieth street, which carries the road under a number of streets, has been begun, and work is being pushed rapidly to the point where connection will be made with the Philadelphia & Reading tracks near Thirtieth street. The construction of this tunnel involves considerable work, as it will require a slight change in the grade of the city's street and the laying of several new sewers and a new line of water pipes, all of which is to be done by the company. On the Delaware Branch of the road work is also progressing at several points, and a large part of the grading is now finished and track-laying has been begun.

Beech Creek, Clearfield & Southwestern.—In the suit brought by the Attorney-General of Pennsylvania to enjoin the sale of this road, the Circuit Court at Harrisburg has given its opinion, continuing the temporary injunction against the Pennsylvania Railroad Co. and the Northern Central Railroad Co., and dissolving it as against the other parties made defendants in the suit. The court holds that the companies named are not in position to claim that the bargain, if carried out, would not violate the provisions of the Constitution in relation to the consolidation of parallel and competing lines.

The decision in this case is practically the same as that in the South Pennsylvania case, and in this case also an appeal will be taken to the Supreme Court.

Burlington & Lamolite.—A St. Albans dispatch says this road has been leased to the Central Vermont Co., which has controlled it for some time past. It is 34 miles long, extending from Burlington, Vt., to Cambridge Junction, and was originally built to connect Burlington with the St. Johnsbury & Lake Champlain road.

Chicago, Burlington & Northern.—The grading of this road is now completed through Prairie du Chien, Wis., and for several miles northward of that town, and the line from Prairie du Chien to La Crosse will probably be finished this month, provided the weather permits. There has been some delay in building the bridge across the Wisconsin River, on account of the difficulty experienced in putting in the foundation for the piers.

Chicago, Milwaukee & St. Paul.—In the United States Circuit Court in Chicago, last week, a decision was rendered in a suit brought by the Third National Bank, of Chicago, to recover about \$45,000 on a claim against the old Chicago & Pacific Co., whose road has since passed through foreclosure and into the possession of the Chicago, Milwaukee & St. Paul Co. The court decides that the bank is entitled to recover the amount of its judgment, and that they are a lien against the property.

Cincinnati, Hamilton & Dayton.—Some large purchases of this company's stock have recently been made in Cincinnati, and brokers there have secured options on somewhat over one-half of the stock. In whose interest these purchases are made has not been made public, though common report has it that they were made for Mr. H. J. Jewett and his associates, but the brokers who bought the stock have refused to give any information.

Cincinnati, Selma & Mobile.—This road will hereafter be controlled by the Western Railroad of Alabama, under a traffic contract, and will be operated under the management of the officers of that road. It extends from Selma, Ala., the western terminus of the Western road, west by north to Akron, on the Alabama Great Southern, a distance of 71 miles.

Cincinnati, Van Wert & Michigan.—A contract has been let for the extension of this road from its present terminus at South Manchester, O., southward to the Miami River.

Cincinnati, Wabash & Michigan.—The suit brought several years ago by Mr. Wells, one of the contractors who built this road, to recover \$100,000 in bonds of the road, which had been hypothecated to the Lake Shore & Michigan Southern Co. as security for advances made to pay coupons, has been settled by a compromise. The bonds were deposited by Mr. Wells' partner in the construction of the road, but he claims that they were his individual property and not that of the firm. Since the suit was begun the road has been sold under foreclosure, and the bonds in dispute are now an equivalent for stock in the reorganized company. Under the compromise settlement Mr. Wells will receive 37½ per cent. of this stock, the Lake Shore Co. retaining possession of the remaining 62½ per cent.

Connecticut Railroads.—The report of the Connecticut Railroad Commissioners for the year ending Sept. 30 last gives the total length of completed road in the state at 973 miles, showing no increase during the year. The total mileage operated by the companies reporting to the Commission was 1,517 miles, 544 miles being out of the state. The stock and debt of these companies was:

Stock.....	\$58,578,477
Funded debt.....	26,981,000
Other debt.....	7,294,310

Total.....\$92,853,787
Cost of roads and equipments.....90,578,049
The stock is \$39,849 per mile of road and the debt \$23,832, the cost of road being \$59,961 per mile.

The traffic for the year was as follows:

	1884-85.	1883-84.
Train-miles.....	11,786,130	11,414,284
Passengers carried.....	17,430,921	16,957,574
Tons freight carried.....	6,873,907	8,169,319

The earnings per train-mile last year were 192.5 cents; expenses 90 cents and the net earnings 42.5 cents. The large decrease in freight tonnage is noticeable.

The earnings of all the roads for the year were as follows:

	1884-85.	1883-84.
Earnings.....	\$15,625,452	\$15,934,299
Expenses.....	10,617,214	11,516,749

Net earnings.....\$5,008,238 \$4,417,550

The earnings last year were \$10,300 gross and \$3,301 net per mile. Eleven companies paid dividends averaging 8.36 per cent. on their stock and amounting to \$2,628,071 in all. No dividends were paid on \$37,167,050 of stock, and there was \$1,242,852 interest overdue on \$15,300,000 bonds on Sept. 30 last.

Delaware, Lackawanna & Western.—Negotiations are pending for the extension of the Montclair branch of this company's Morris & Essex Division from Montclair, N. J.,

to Caldwell. The people of the last-named town have submitted an offer to the company and the answer is expected in a few days. Should the line be extended to Caldwell, it is expected that a further extension will be made through Whippany to Morristown. This section would not only open a very desirable country for suburban settlement, but it would also give the company a loop line from Newark to Morristown with better grades than the existing line.

Denver & Rio Grande Western.—The actual gross earnings for November, 1885, were \$98,564; the expenses for the month were \$63,542, leaving the net earnings \$35,022. Deducting rental of equipment and month's proportion of taxes and insurance, amounting to \$5,580, a net balance of \$29,442 remains for the month, which is equal to 0.43 per cent. on the first-mortgage bonds.

Dubuque & Northwestern.—This company has let a contract to D. C. Shepard & Co., of St. Paul, Minn., for grading the road from the present terminus of the grade to Hayfield, Minn., where connection is to be made with the Minnesota & Northwestern road. There are now 8 miles of track laid on the road from Dubuque to Durango, Ia., and the grading is completed for 16 miles further. The contract calls for the completion of this line by November next.

Eastern.—Mr. Willard P. Phillips, one of the trustees under the mortgage of this road, has addressed a letter to the chairman of the late meeting of bondholders, acknowledging the receipt of the resolutions passed at that meeting. Mr. Phillips claims that he has only performed strictly his duty as trustee and is not conscious that he has in any way gone outside of that duty. He also claims that the meeting at which the resolutions were passed was not a properly constituted meeting of the bondholders and had no authority to speak for those bondholders. He does not directly respond to the resolutions passed by the meeting requesting him to resign his position as a trustee, but he does not indicate that he has any intention of resigning.

East Tennessee, Virginia & Georgia.—This company had its road blocked for nearly a week by an accident in a tunnel south of Dalton, where a locomotive mounted on a flat car in a freight train knocked down some of the timbering, causing a cave-in. During the blockade trains were run from Dalton to Atlanta over the Western & Atlantic tracks, that company having offered the use of its tracks temporarily.

Galveston, Sabine & St. Louis.—Application has been made to the United States Circuit Court for the appointment of a receiver for this road by certain of the creditors, and the application was heard at Dallas, Tex., last week, the court reserving its decision. The road is a narrow-gauge line, now in operation from Longview, Tex., to Martins Creek, 22 miles. An extension to Sabine Pass and Galveston is projected, and some grading has been done beyond the present terminus.

The Court, after hearing the application, decided to appoint a receiver as asked. The suit was brought by the Galveston & St. Louis Construction Co., contractor for building the road, on claims amounting to \$210,000 in all.

Grand Trunk.—This company's statement for November and the five months from July 1 to Nov. 20 is as follows:

	November.	1884.	Five months.	1884.
Earnings.....	\$263,126	\$289,142	\$1,355,024	\$1,544,811
Expenses.....	206,958	224,372	1,029,372	1,112,280

Net earnings \$56,168 \$64,770 \$325,647 \$432,531
For the five months the gross earnings decreased \$189,778, or 12.3 per cent., and the expenses \$82,883, or 7.5 per cent., leaving a decrease in net earnings of \$106,904, or 24.7 per cent.

The controlled lines west of Detroit make the following showing for the five months:

	Chi. & Gd. Trunk.	1884.	Det., G. H. & Mil.	1884.
Earnings.....	\$228,932	\$277,503	\$113,301	\$120,638
Expenses.....	193,001	205,401	76,837	82,046

Net earnings.. \$35,931 \$72,102 \$36,464 \$38,592
The Chicago & Grand Trunk shows a decrease in gross earnings of \$48,571, or 17.5 per cent., and a decrease in net earnings of \$36,171, or 50.2 per cent. The Detroit, Grand Haven & Milwaukee had a decrease of \$7,397, or 6.1 per cent., in gross earnings, and of \$2,128, or 5.5 per cent., in net earnings.

Gulf, Colorado & Santa Fe.—Work is progressing rapidly on the extension of this road from Brownwood, Tex., northwest to Coleman, a distance of 35 miles. A large part of the grading is done, track-laying is in progress, and the rails are reported down for five miles from Brownwood. The company's engineers have located a line from Coleman westward, about 40 miles, to a point on the Colorado River, four miles south of Rummels. At this point the company has bought a large tract of land, with the apparent intention of establishing a new town. This location is supposed to indicate the company's intention of building to San Angeles.

Hartford & Harlem.—The report of the Connecticut Railroad Commission states that under the provisions of the law this company was required to expend in construction at least 10 per cent. of its subscribed capital by Nov. 30 last. The officers of the company have filed with the Secretary of State a certificate that the required amount has been so expended, and under the law the company now has until Dec. 30, 1888, to complete its road and put it in operation. No work is now actively in progress on the road.

Houston & Texas Central.—The following statement is published for the eleven months to Nov. 30:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings.....	\$2,412,858	\$2,311,024	I. \$101,834	64.8
Expenses.....	1,870,843	2,040,441	D. 169,598	8.0
Net earnings.....	\$536,015	\$270,583	I. \$265,432	135.2
Interest, floating debt.....	27,379	86,175	D. 58,796	64.2
New construction.....	73,896		I. 73,896	....
Total.....	\$101,275	\$76,175	I. \$25,100	33.0
Balance.....	\$434,740	\$194,408	I. \$240,332	123.6

Renewals and betterments are included in expenses. The interest on the bonded debt for the eleven months this year is stated at \$1,114,608, showing a deficit of \$679,868.

Kansas City, Springfield & Memphis.—This company, it is reported, has engineers at work surveying a line from Memphis, Tenn., eastward through Holly Springs to Birmingham. The company, it is said, has been negotiating for the purchase of the Memphis, Birmingham & Atlantic road from Memphis to Holly Springs, but now believes that it can build a line of its own for less money than is asked for the existing road.

Kentucky Central.—It is stated that as soon as the weather will permit this company will begin work on the extension of its line from the present terminus in Covington, Ky., to the river front, where arrangements are already in progress for the building of the necessary incline to transfer cars to the ferry-boats.

Knox & Lincoln.—At an adjourned meeting at Bath, Me., Jan. 17, a report was presented by a committee appointed at a preceding meeting, to see what arrangements could be made for the purpose of selling this road. The committee reported that it was not advisable to attempt to sell the property at the present time, and presented a resolution requesting the directors to confine expenditures on the road to an amount sufficient to keep it in safe condition for travel.

Lehigh Valley.—A report was started in Philadelphia last week to the effect that this company was already negotiating for the lease of the North Pennsylvania, the Delaware & Bound Brook and the New Jersey Central roads, in the expected event of the abrogation of the leases of those roads to the Reading Co. by the foreclosure of the Reading mortgages and the organization of a new company. Officers of the Lehigh Valley, however, state that these reports have no bases whatever, and that the question has not even been discussed by the directors of the company.

St. Louis & Cairo.—A special meeting of the stockholders has been called for March 15 next, to vote in the question ratifying the lease of this road to the Mobile & Ohio Co., and also on authorizing the issue of new bonds, as called for under the proposed lease. No considerable opposition is expected, as, while the lease makes no provision for the stockholders, the stockholders are also generally the bondholders, the present stock having been issued for the old bonds and overdue coupons.

Memphis & Charleston.—This company has made temporary provision for its floating debt. The company has owned \$750,000 for past-due coupons, equipment and supplies. General Thomas, John T. Martin and others interested in the company have been principal creditors. It has been decided to borrow enough money on the \$1,000,000 of second mortgage bonds in the company's treasury until such time as the market will enable said bonds to be sold at satisfactory prices.

Memphis, Selma & Brunswick.—The United States Circuit Court at Knoxville, Tenn., on Jan. 16 decided to appoint a receiver for this road on application of the Guarantee Trust & Safe Deposit Co., of Philadelphia, trustee under the mortgage made by the company for \$1,000,000. The road was originally intended to run from Memphis, Tenn., to Selma, Ala., and was partly graded some time ago, when work was abandoned. Last year a receiver was appointed at the suit of the floating debt creditors, who were mainly the contractors for the building of the road, and a receiver was appointed, who completed the line from Memphis to Holly Springs, Miss., a distance of 45 miles. Recently a new company known as the Memphis, Birmingham & Atlantic was organized, which took possession of the completed section of the road, and is now operating it. The Receiver's appointment covers the property from Memphis, through Holly Springs to the Alabama state line, as described in the mortgage.

A later dispatch says that Judge Hammond, sitting in Memphis, set aside the order appointing the receiver, and that further arguments will be heard in the case.

Mexican National.—A dispatch from Mexico reports that this company has placed a loan in London and will shortly resume work on the completion of its line in Mexico.

Mexican Railroad Notes.—The following notes are from the *Mexican Financier* of Jan. 9:

The question of freight rates is bound to become again a matter of public interest and discussion. Experienced railway men can see no profit in doing business at present rates. Mexican railroads have got to earn more money to meet demands for extraordinary expenses for repairs, maintain rolling stock in good condition, and pay interest on securities.

The board of directors of the projected Nuevo Leon Railroad has been installed. The route of the line runs through a very fertile country, and we hear that the hacendados along the route offered to subscribe half the cost of building the road. The road is designed to connect with the National. Efforts to secure foreign capital to aid in constructing the road have not been successful. Nuevo Leon ought to be able to build the road itself.

Missouri Pacific.—This company gives notice that the stockholders will be asked to authorize, at a meeting to be held in St. Louis, March 10, an increase of the capital stock from \$30,000,000 to \$36,000,000, the new stock to be offered from time to time to the stockholders, ratably, at par, as the funds may be required by the company.

In the circular, which is signed by Mr. A. H. Calef, Treasurer, the following explanations are given for the increase in the capital of the company:

"During the past year it has been deemed necessary and expedient by your directors, in order to protect the present traffic of your railway and insure its future growth, to provide for the acquisition of the control or ownership of the following properties:

	Miles.
Omaha Belt.....	18
Topeka, Salina & Western.....	57
Lincoln Extension.....	35
Wichita & Colorado.....	50
Minden Branch.....	72
St. Louis, Fort Scott & Wichita.....	246
Paola to Kansas City.....	54
Verdigris Valley, Ind. & Western.....	70
Leroy & Caney Valley.....	35
St. Louis & Emporia.....	50
Total.....	687

"The acquisition of other properties, necessary in the judgment of your directors to extend its system or for its use, may be required to protect it from rival lines, and secure the economical operation of its roads.

"It will be necessary, under the laws of the states through which your roads are operated, to own or control some of these branches or extensions by means of independent auxiliary local railway corporations, through the acquisition of their bonds or stock, or both. This company, so far as it shall use the proceeds of the sale of such additional stock for this purpose, will place the acquired bonds and stock of such railway corporations in the hands of Russell Sage, Henry G. Marquand and George J. Gould, in trust, to be held by them as trustees for the Missouri Pacific Railway Co., and not to be pledged or sold, or in any way disposed of, unless this company shall acquire the full ownership, by consolidation or otherwise, of the local railway company or companies whose shares or bonds, or both, it shall require through the sale of the new stock.

"Any revenue derived from the securities held by this trust will be paid to the Treasurer of the Missouri Pacific Railway Co., to be held by him as income of that company.

"The transfer books of the company will be closed Feb. 6, for the annual meeting, and stockholders of record at that date will have the privilege of subscribing to an issue of stock at par equal in amount to one-tenth of their respective holdings; every 10 shares of the old stock carrying the right of subscription to one share of the new. This subscription will be subject to the decision of the stockholders' meeting. The transfer books will be reopened March 11, and on that day the right to subscribe will expire. Subscriptions will be payable to A. H. Calef, Treasurer, at the office of the company, No.

195 Broadway, in two installments, as follows: 50 per cent., March 15; 50 per cent., April 15."

It is reported that this company will begin work shortly on a branch of its Iron Mountain line from Bald Knob, Ark., to Memphis, Tenn. The plan for the new branch contemplates a bridge over the Mississippi, and an entrance into Memphis without the necessity of using the transfer ferry, and it is said that the company's engineers have been making a careful examination of the river at Island No. 40, about 5 miles above Memphis.

Mobile & Ohio.—In relation to this company's lease of the St. Louis & Cairo road, it is reported from St. Louis that a further agreement has been made under which the Texas & St. Louis Co. is also to have the use of the leased road from Cairo to East St. Louis, and is to pay a share of the rental, based upon the traffic which it may bring to the line. The contract, of course, will not take effect until the reorganization of the Texas & St. Louis Co. is completed; but it is stated that all the details have been arranged and settled between the officers of the Mobile & Ohio and those of the Texas & St. Louis reorganization committee.

Newport News & Mississippi Valley.—The stockholders of the Chesapeake, Ohio & Southwestern Co., at a meeting held in Memphis, Tenn., Jan. 15, voted to ratify the proposed lease of their road to this company, which is, it is understood, to take leases of all the lines commonly known as the Huntington roads, extending from Newport News to New Orleans. The Elizabethtown, Lexington & Big Sandy stockholders have also approved the lease of their road.

New York & Connecticut Air Line.—The Connecticut Railroad Commissioners report that nothing of any consequence has been done on the line of this projected road during the year. Under the general law under which it was organized the company has now only until Oct. 26 next in which to complete its road from New Haven to the New York line. If not completed by that time the corporate existence will cease. It is evident that the work cannot be done in the short time remaining, and the company has given notice of application to the Legislature for a special act extending the time for the completion of the road. This will probably meet with opposition, both from the existing lines and from the Hartford & Harlem Co., whose projected route covers substantially the same line.

Pennsylvania.—The adverse decision of the Circuit Court at Harrisburg in the South Pennsylvania and the Beech Creek, Clearfield & Southwestern cases are noted elsewhere. In both cases an appeal to the Supreme Court will be taken. It is claimed that even should the Supreme Court uphold the decision of the Circuit Court, a way can be found to evade the decision and complete practically the transfer of the two roads.

Philadelphia & Reading.—The Receiver's statement for November gives the earnings of the railroad as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings.....	\$2,666,450	\$2,554,133	I.	\$112,317 4.4
Expenses.....	829,076	1,309,144	D.	480,068 36.3
Net earnings.....	\$1,837,374	\$1,244,989	I.	\$592,385 47.6

The traffic reported for the month of November is as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passengers carried.....	1,848,028	1,787,386	I.	61,542 3.5
Tons merchandise.....	762,745	665,381	I.	97,364 14.6
Tons coal.....	1,283,381	1,231,357	I.	52,024 4.2
Tons coal on colliers.....	41,459	48,539	D.	7,080 14.4

The earnings of the Philadelphia & Reading Coal and Iron Co. for the month were:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings.....	\$1,605,748	\$1,645,577	D.	\$39,829 2.4
Expenses.....	1,386,701	1,132,084	I.	253,717 20.3

Net earnings..... \$219,047 \$492,593 D. \$273,546 55.5

The statement of coal mined from lands owned by the company is as follows:

	1885.	1884.	Inc. or Dec.	P. c.
By company.....	547,900	591,456	D.	43,556 7.4
By tenants.....	83,945	66,741	I.	17,204 25.7
Total.....	631,845	658,197	D.	26,352 4.0

The joint net earnings of the two companies were as follows, being the sums from which all charges are to be met, as the expenses include nothing for interest or rentals:

	1885.	1884.	Inc. or Dec.	P. c.
Railroad Co.....	\$1,837,374	\$1,244,989	I.	\$592,385 47.6
Coal & Iron Co.....	219,047	492,593	D.	273,546 55.5

Total..... \$2,056,421 \$1,737,582 I. \$318,839 18.3

The statements for the fiscal year, which closes with November, were published last week.

Pittsburgh & Lake Erie.—In the suit brought against this company to compel it to make certain alterations in its bridge over the Ohio River at Beaver, Pa., the court has decided in favor of the company, but has declined to make any order in the case until a further hearing has been given to the government.

Pittsburgh & Preston County.—This company has been organized to build a railroad from a point on the Baltimore & Ohio, in Preston County, W. Va., east of the Cheat River, northward to Clifton Mills, and thence up Big Sandy Creek to the Pennsylvania line, whence it will be extended to a connection with the Southwest Pennsylvania road. The line will be about 35 miles long, and the office of the company is at Bruceton, W. Va. The capital stock is fixed at \$100,000.

Poughkeepsie Bridge Co.—This company has been reorganized and an attempt will be made to resume work on the construction of the bridge over the Hudson River at Poughkeepsie, on which a considerable amount was expended several years ago. Nothing remains of this work, we believe, except the caissons for two of the piers.

Rutherford.—In regard to the notice recently published by the directors of this company, protesting against a mortgage of the proposed road and an issue of bonds made to the Massachusetts & Southern Construction Co., officers of the last-named company publish a long statement, claiming that the issue was regularly made under the contract between the companies, and that the bonds are not to be sold unless the road is completed. They also claim that the opposition to the issue of the directors in question is based on personal grounds.

St. Louis, Belleville & Eastern.—This company has been incorporated to build a railroad from Belleville, Ill., to Centralia, and thence to Mount Vernon, a distance of about 60 miles. Considerable interest is taken in the project along the line, and local subscriptions to the stock are promised.

Savannah, Florida & Western.—Work is reported in progress on a branch from this company's Gainesville line to Lake City, Fla., a distance of about 25 miles.

This company's Sanford & Indian River road is now completed to Ovidio, 8 miles southward from the late terminus at Lake Jessup and 14 miles from Sanford. Regular trains are now running to the new terminus. This track was laid last year.

Sheffield & Birmingham.—This road is reported completed from Sheffield, Ala., on the Tennessee River, southward to Russellville, 17 miles, and trains will shortly be put on this section. Work on the grading is progressing steadily south of Russellville.

Southern Pacific.—The financial statement for all this company's lines for November is as follows:

	Atlantic system.	Pacific system.	Total.
Earnings.....	\$1,003,077	\$1,715,519	\$2,718,596
Expenses.....	515,753	769,375	1,285,128
Net earnings.....	\$487,324	\$946,144	\$1,433,468
Add rental Mojave Division.....			36,355
Total net income.....			\$1,469,823
Fixed charges.....		\$1,216,388	
Construction and improvements.....		81,196	
			1,297,584

Net profit for the month..... \$172,239

Fixed charges include interest, rentals, United States requirements and guarantee on Central Pacific. As compared with November, 1884, the gross earnings decreased \$114,000, or 4 per cent., but there was a gain of \$52,899, or 4 per cent., in net earnings.

South Pennsylvania.—The Circuit Court of Dauphin County, Pa., on Jan. 15, gave its decision on the application of the Attorney-General for an injunction to prevent the transfer of this road to the Pennsylvania Railroad Co. After a statement of the well-known facts in the case, the Court holds that the South Pennsylvania is in effect such a parallel and competing line as to bring it within the provisions of the Constitution. Regarding the rights to sell the stock, the Court says that the proposed combination was for the express purpose of abandoning the duty imposed upon the company to build the road and for the purpose of putting the control into the hands of a rival. This is held to be an act contrary to the public policy of the state and in violation of the contract implied in the charter. It is impossible, the Court says, to draw any other inference than that the sale was in reality to the Pennsylvania Railroad Co., and that any pretense of a sale to other parties was merely intended to cover up the real transaction. The Court says in conclusion:

"We propose here to show merely that the parties in this transaction were not dealing with a purely private matter. We will not pursue this subject further, nor are we now concerned with the question whether there be power in the courts to compel the construction of a railroad by a corporation which has undertaken it. What we here denote is simply that the corporations have no such rights to sell their stocks as can in any way interfere with a granting of an injunction to prevent a competing corporation from obtaining control of a corporation charged with the duty of the construction. We have not overlooked any of the questions argued by counsel, but in our view the case does not call for the decision of any others than those considered above. The result of the discussion is that the injunctions must be continued to the Pennsylvania Railroad Co., the Pennsylvania Co., and the Bedford & Bridgeport Co., and dissolved as to the other defendants."

It is understood that the Pennsylvania Railroad Co. and the other parties to the transaction will promptly appeal from this decision to the Supreme Court. That court is now in session, and the case can probably be heard at the present term.

Toledo, Saginaw & Muskegon.—This company has filed articles of incorporation in Michigan to build a railroad from Muskegon, through Greenville to Ithaca, where it will connect with the Toledo, Ann Arbor & North Michigan road. The company is organized in the interest of the Ann Arbor road.

Wabash, St. Louis & Pacific.—On Jan. 13 Judge Welcker entered a decree in the United States Circuit Court at Toledo for the sale of the Wabash Railroad. The decree was similar to the one entered in the main suit, pending at St. Louis, by Judges Brewer and Treat. The road is to be sold on the consolidated mortgage, and subject to all prior liens and mortgages in the several divisions originally forming separate roads. The sale takes place at St. Louis by Edmund T. Allen, Master in Chancery, at a minimum price of \$1,000,000.

West Shore.—General Passenger Agent Henry Monett issues the following, dated New York, Jan. 12.

"On and after 13th inst. trains on West Shore Railroad will arrive at and depart from the Exchange street depot of the New York Central & Hudson River Railroad in the city of Buffalo. On the date mentioned, and thereafter, trains will be run over the Niagara Falls Division of the New York Central & Hudson River Railroad between Buffalo and Suspension Bridge, and will be withdrawn from the Erie Railway between same points. This arrangement gives to the West Shore Railroad equal accommodations with other lines in Buffalo, and the benefit of Union depot connections with the Grand Trunk, the Lake Shore & Michigan Southern, and the Michigan Central Railroads. Please discontinue the use of transfer coupons between the West Shore and lines designated. Through sleeping cars, in service with the Grand Trunk Railway, will be run through the Buffalo station, and delivered to and received from the Grand Trunk Railway at Suspension Bridge, as heretofore."

Wheeling & Lake Erie.—At Cleveland, Jan. 13, Judge Welcker entered a decree in the Circuit Court for a sale of this road. It is to be sold under the first mortgage, and any surplus after paying the bonds is to be brought into court for future distribution. The sale is to be made at Cleveland at a date to be fixed hereafter by W. F. Goodspeed, as special master, at a minimum price of \$100,000.

The road extends from Toledo, O., to Bowerstown, 174½ miles, with a branch to Huron, 12½ miles. Some work has been done on an extension from Bowerstown to Wheeling. It has been in possession of a receiver since July, 1884. By the last report there were \$2,550,000 first-mortgage bonds and \$2,280,000 second. In 1884 the road earned \$510,776 gross and \$112,368 net, the yearly interest charge being \$354,600. The road was chiefly built and owned by the late Commodore Garrison.

Wilmington & Weldon.—This company is building a branch one mile long, from Castle Hayne, N.C., to some large beds of phosphate recently discovered. These beds are to be worked by a company and are expected to bring considerable traffic to the road.

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette*:

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Lehigh Valley.

The report of the President, as read at the annual meeting this week, gives the following figures for the operations of this important company for the year ending Nov. 30 last. The full report will be published later.

The capital stock is \$33,099,100 and the funded debt \$24,458,000, an increase of \$144,200 in stock and a decrease of \$228,000 in bonds. There is no floating debt.

The income statement is as follows:

	1885.	1884.
Receipts from all sources.....	\$9,280,261	\$10,186,351
Expenses of road.....	4,888,908	5,246,073
Net income for the year.....	\$4,400,263	\$1,940,278
Interest, rentals, depreciation, etc.....	2,709,926	2,530,563
Net balance.....	\$1,690,337	\$2,409,715

From the net balance last year dividends amounting to 5 per cent. were paid, requiring \$1,660,234, and leaving a surplus of \$30,103. In 1884 the dividends were 8 per cent.

The earnings of the road were as follows:

	1885.	1884.	Dec.	P. c.
Earnings.....	\$8,556,917	\$8,948,207	\$391,290	4.4
Expenses.....	4,888,797	5,246,073	357,276	6.8
Net earnings.....	\$3,667,919	\$3,702,134	\$34,215	0.9
Per cent. of exps.....	57.1	58.6	1.5	...

The coal tonnage of the road, including bituminous coal, was 6,312,430 tons, against 6,068,967 tons in 1884, an increase of 243,463 tons, or 4 per cent.

During the year the company has added to its equipment new cars valued at \$361,000, and has purchased and canceled the Morris Canal boat loan, which matured Oct. 1 last.

Fitchburg.

This company owns a line from Boston to Fitchburg, 50.68 miles, with 45.23 miles of branches, and the Worcester Division, from Winchendon, Mass., to Worcester, 36 miles. It leases the Vermont & Massachusetts, Fitchburg to Greenfield, 56 miles, with one branch, 2.80 miles, making a total of 190.71 miles worked. It also runs trains over the Troy & Greenfield road, Greenfield to North Adams, 37 miles, paying tolls for its use to the state. This makes the total main line, from Boston to North Adams, 143.68 miles long. The report is for the year ending Sept. 30.

Additions during the year were the Worcester Division (formerly the Boston, Barre & Gardner Railroad), 36 miles, worked from March 7, 1885, and the Ashburnham Branch (formerly the Ashburnham Railroad), 2.59 miles, worked from April 22, 1885.

The equipment includes 107 locomotives; 135 passenger and 20 mail and baggage cars; 2,983 box, 748 flat and 41 caboose cars; 260 service cars and 10 snow-plows.

The general account, condensed, is as follows:

Capital stock.....	\$5,286,500
Funded debt.....	5,140,000
Notes, accounts and balances payable.....	907,342
Renewal fund.....	20,000
Profit and loss.....	390,042
Total.....	\$11,744,484

Road, equipment, etc..... \$8,963,146

Other property..... 538,236

Vermont & Mass. improvements..... 1,194,477

Materials..... 384,128

Debit balances..... 327,803

Cash and cash funds..... 349,694

Stock was increased \$336,000 and funded debt \$1,140,600 during the year. Cost of road, etc., increased \$1,858,306.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passengers.....	\$979,205	\$901,753	\$77,452	8.6
Freight.....	1,712,182	1,775,248	63,066	3.6
Mail and express.....	96,062	90,688	5,374	5.9
Rents, etc.....	103,822	88,968	14,854	16.7
Total.....	\$2,891,251	\$2,856,657	\$34,594	1.2
Expenses.....	2,146,965	2,131,404	15,561	0.7

Net earnings..... \$744,286

Gross earn. per mile..... 16.647

Net..... 4.285

Per cent. of exps..... 74.3

Expenses include taxes, which amounted to \$137,093 last year and \$151,796 in the preceding year.

The result of the year was as follows:

Net earnings, as above.....	\$744,290
Interest paid.....	\$220,688
Rental of leased lines.....	252,581
Dividends, 5 per cent.....	247,500
Total.....	720,769

Balance, surplus for the year..... \$23,521

During the year 2,654 tons of steel rails and 132,455 new ties were used in renewals; three heavy locomotives replaced old light ones, and the equipment was maintained in good condition.

Expenditures for improvements last year were: Fitchburg Railroad, \$1,233,914; Vermont & Massachusetts, \$180,425; real estate, \$7,649; Hoosac Tunnel Dock & Elevator Co., \$37,400.

The traffic for the year was as follows:

Train miles:	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passenger.....	1,114,449	981,955	132,494	13.5
Freight.....	980,878	1,004,364	23,486	2.3
Service and switch.....	582,960	497,313	85,647	17.2

Total..... 2,688,287

Passengers carried..... 3,791,035

Passenger miles..... 53,418,653

Tons freight carried..... 2,112,155

Ton-miles..... 161,905,750

Av. train load:

Passengers, No..... 47.9

Freight, tons..... 163.4

Av. rate:

Per passenger-mile..... 1.83 cts.

Per ton-mile..... 1.06 "

The earnings per train mile were 107 cents; expenses, 79.8, leaving the net earnings 27.2 cents. The average rate per ton-mile on local freight was 2.96 cents; on all freight to and from other roads, 0.73 cent; on tonnage passing through the Hoosac Tunnel, 0.555 cent.

The report says: "The report includes the earnings of the Worcester Division from March 7 to the close of the year. Therefore, while the gross earnings show an apparent gain, as compared with the previous year, the Fitchburg proper shows a loss in gross earnings of about \$71,000. This is wholly accounted for by the war of rates in through business which has raged through the entire year, prices having been lower than in any previous year in the history of the road, freight through the Tunnel being for months carried at a positive loss.

"The purely local business shows a very satisfactory gain, and justifies the belief that continued care of that class of traffic from which dividends must largely come will in the future tend still further to our advantage.

"The board congratulates the stockholders upon the fact

that in spite of all the obstacles with which the road has contended, a dividend has been earned, the value of the property fully maintained, and furthermore that rates, of both passenger and freight, are at last fully restored, so they have reason to believe that our thorough business for the year to come will pay us a fair profit.

"The work of building double track on the Vermont & Massachusetts road has not been wholly completed in 1885, as was hoped. The bridge over the Connecticut River has been built, and that over the Deerfield River is well under way, leaving about 1½ miles to finish the second track to Greenfield.

"On March 7 this company took possession of the Boston, Barre & Gardner road, extending from Worcester to Gardner, where it connects with our main line, and thence to Winchendon, connecting with the Chesire and the Monadnock roads; and under an act of the Legislature, approved April 23, and accepted by the stockholders May 7, 1885, the road was, July 1, consolidated with the Fitchburg, and became a part of this road. Although it has required a considerable outlay to place this division in a condition for economical operation, there can be no doubt that it will become a very important part of our system, as it gives us access to Worcester, a city of some 70,000 population, with its varied industries. Every day confirms us in the belief of the wisdom of its accession.

"During the year we have, under authority of the Legislature, purchased all the stock of the Ashburnham Railroad, extending from Ashburnham Junction to Ashburnham, 2.59 miles, and took possession of the same on April 22, 1885."

Pittsburgh & Lake Erie.

This company owns a line from Pittsburgh, Pa., to Youngstown, O., 68 miles, with a branch to New Castle, Pa., 2.9 miles, making 70.9 miles in all. The statements below, for the year ending Dec. 31 last, are from the reports presented at the annual meeting last Monday.

The company also leases the Pittsburgh, McKeesport & Youghiogheny, from Pittsburgh to New Haven, Pa., 57 miles, with the Youghiogheny Northern Branch, 2.6 miles, and the Dickinson Run Branch, 4.5 miles, 74.1 miles in all. The earnings of that road are given separately.

The capital stock of the company is \$2,050,000, and the funded debt consists of \$2,000,000 first-mortgage 6 per cent. bonds. There was no change during the year.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight.....	\$988,415	\$974,653	\$13,762	1.4
Passengers.....	187,754	183,765	3,989	2.2
Mail, etc.....	25,143	23,103	2,040	8.8
Total.....	\$1,201,312	\$1,181,521	\$19,791	1.7
Expenses.....	806,905	809,227	2,322	0.3

Net earnings..... \$394,407

Gross earn. per mile..... 16.647

Net..... 5.423

Per cent. of exps..... 67.2

The increase in freight earnings was due to a large increase in traffic, the average freight rate last year having been 14.3 per cent. less than in 1884.

The result of the year was as follows:

Net earnings, as above.....	\$394,407
Interest on bonds.....	\$120,000
Interest on scrip and floating debt.....	59,224
One-half loss on P., McK. & Y. lease.....	19,451
Total.....	198,675

Balance, surplus for the year..... \$195,732

Add premium on P., McK. & Y. second mort. bonds sold..... 21,169

Total..... \$216,901

New construction and equipment..... \$44,702

Reduction in floating debt..... 93,426

Increase in credit balances..... 78,773

Total..... 216,901

No dividend was paid during the year. The surplus was equivalent to 10½ per cent. on the stock.

PITTSBURGH, MCKEESPORT & YOUGHIOGHENY.

The earnings of this leased line were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight.....	\$536,502	\$546,300	\$9,798	1.8
Passengers.....	43,443	41,776	1,667	4.0
Mail, etc.....	7,778	3,525	4,253	121.5
Total.....	\$587,723	\$591,501	\$3,778	0.6
Expenses.....	267,253	204,406	62,847	30.7

Net earnings..... \$320,470

Gross earn. per mile..... 9.169

Net..... 4.990

Per cent. of exps..... 45.5

The rental (6 per cent. on bonds and stock) amounted to \$350,173, showing a loss of \$38,903 for the year. Under the agreement one-half of this loss is borne by the Lake Shore & Michigan Southern Co. and one-half by the lessee.

New York, West Shore & Buffalo.

This company operates in all 498 miles of road, including the main line from Weehawken to Buffalo, 426 miles, and 72 miles of branches. The figures below are from the statement to the New York Railroad Commission for the year ending Sept. 30:

The general balance sheet is as follows:

Capital stock.....	\$40,000,000
Funded debt.....	70,000,000
Interest on funded debt due and accrued.....	4,739,683
Vouchers and pay rolls.....	1,180,937
Open accounts.....	715,279
Loans and bills payable.....	1,007,408
Sundries.....	1,166,368
Receivers' certificates.....	3,804,055
Equipment lease warrants.....	3,312,112
Total.....	\$125,924,840

Road and equipment..... \$101,552,488

Stock, other companies..... 864,441

Cash on hand..... 124,369

Due by agents..... 185,173

Open accounts..... 1,139,808

Materials and supplies..... 401,471

Sundries..... 13,949,170

Profit and loss deficiency..... 7,707,891

Total..... 125,924,840

This has, of course, been entirely changed by the foreclosure and reorganization; it is given only as showing the condition of the old company just before the foreclosure.

The earnings reported for the year were:

	1884-85.	1883-84.	Increase.	P. c.
Earnings.....	\$3,493,416	\$2,979,331	\$514,085	17.3
Expenses.....	4,531,096	3,664,294	866,802	23.7

Deficit..... \$1,037,680

Gross earn. per mile..... 7.015

Per cent. of exps..... 129.7

In 1883-84 the road was operated for its full length only nine months; for eight months of the year it was worked by the company and for four months by the Receivers. In

1884-85 the full mileage was worked for the entire year by the Receivers.

The result of the year was as follows:

Net deficit, as above.....	\$1,037,680
Income from other sources.....	219,500

Balance, deficit..... \$818,180

Interest on receivers' certificates..... 155,573

Rentals, taxes, etc..... 515,186

Total deficit for the year..... \$1,488,939

This statement includes nothing for interest on bonds. The total deficit on Sept. 30 was \$7,707,891, including overdue interest. Betterments reported to road and equipment amounted to \$1,922,634 for the year.

Maine Central.

This company owned or leased and worked the following lines at the close of its fiscal year Sept. 30 last:

	Miles.
Portland, Me., to Bangor.....	137
Branches owned.....	210
Belfast & Moosehead Lake, leased.....	33
Dexter & Newport, leased.....	14
European & North American, leased.....	14
Eastern Maine, leased.....	114
Total.....	527

The system forms a main line from Bangor to the New Brunswick boundary line at Vanceboro, 251 miles, with branches reaching nearly every important town in the state. The company also operates a steam ferry between Mt. Desert Ferry and Bar Harbor on the island of Mt. Desert, a distance of 7½ miles.

The equipment includes 84 locomotives; 92 passenger and 41 baggage, mail and express cars; 789 box, 979 flat and 48 caboose cars; 81 service cars, 19 snow-plows and 15 flange scrapers. During the year 8 locomotives, 1 postal and 2 baggage cars, 1 caboose and 25 dump cars were bought or built in the shops.

The general account, condensed, is as follows:

Capital stock.....	\$3,603,300
Stock bonds.....	16,800
Fund'd debt.....	11,154,900
Scrip Port. & Ken. stock, etc.....	14,383
Bills, accounts and balances payable.....	690,689
Profit and loss.....	115,133
Total.....	\$15,565,215

Road and equipment..... \$12,056,598

E. & N. A. and Androscoggin leases..... 1,708,333

Stocks and bonds owned..... 130,040

Shore Line bonds in trust..... 750,000

Materials..... 375,339

Bills, accounts and balances..... 226,684

Cash..... 258,221

Total..... 15,565,215

The funded debt consists of \$1,100,000 Androscoggin & Kennebec loan; \$496,500 Extension loan; \$758,800 Maine Central loan; \$1,166,700 Portland & Kennebec consolidated; \$425,000 Bath City loan; \$633,000 Leeds & Farmington bonds; \$1,000,000 Bangor city loan, assumed; \$4,175,900 consolidated bonds; \$444,000 collateral trust 5s; \$358,000 debenture 5s and \$599,000 sinking fund 6s. The increase during the year was \$663,300, including \$6,300 consols, \$58,000 debentures and the \$599,000 sinking fund bonds. The last named issue was made to fund the floating debt incurred for the purchase of new equipment, which was made necessary by the operation of the Mt. Desert and other branches.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Freight.....	\$1,502,458	\$1,475,845	\$26,613	1.8
Passengers.....	1,190,074	1,197,413	7,339	0.6
Mail, etc.....	147,247	143,115	4,132	2.9
Rents, etc.....	7,928	10,421	2,493	24.9
Total.....	\$2,847,607	\$2,826,794	\$20,813	0.7
Expenses.....	1,730,902	1,750,714	19,812	1.1

Net earnings..... \$1,116,705

Gross earn. per mile..... 5.493

Net..... 2.119

Per cent. of exps..... 60.8

The expenditures for renewal of road and equipment last year were some \$53,000 in excess of the previous year.

The income account is as follows, condensed:

Net earnings, as above.....	\$1,116,705
Interest paid.....	\$701,767
Rentals of leased lines.....	189,000
Dividends, 6 per cent.....	215,541
Total.....	1,106,368

Balance, surplus for the year..... \$10,397

Premium on bonds sold..... 113

Balance, Oct.